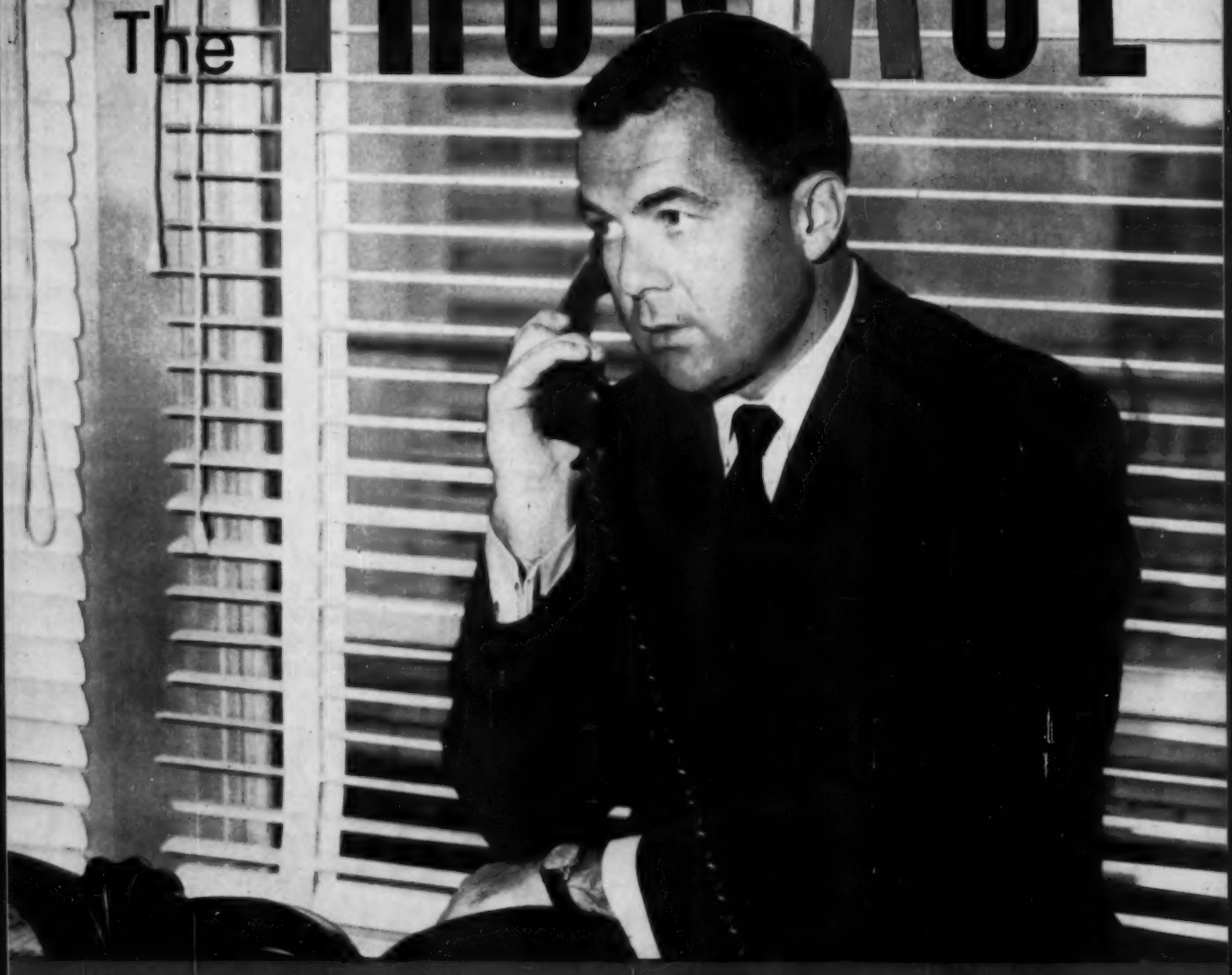
December 20, 1956

The IRON AGE



Theodore W. Kheel

THE OTHER TURN

The socialites

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

Superior Fireplace Company, Baltimore and Los Angeles, builds attractive steel fireplaces like the one depicted here.

How steel sheets keep the home fires burning

There's a warmth by the family fireside that's more than just a matter of BTU's. Rather it is a kind of human warmth that seems to draw family and friends a little closer together. Perhaps this accounts for the enduring popularity of fireplaces in the home.

Today almost any American home can enjoy the cheer of a hearth, thanks to "packaged" fireplaces made of sheet steel. Many of these efficient, popular-priced steel fireplaces are made from Bethlehem sheets. And just in the past decade the tonnage for this application has grown by leaps and bounds.

This is but one example from a growing list of steel products which have recently become important consumers of sheets. At the same time, of course, longer-established users have been upping their sheet requirements, too.

All of which totals up to unprecedented pressure on our sheet-rolling facilities (and they've grown quite a bit themselves!). Needless to say, we are doing everything we can to keep our customers supplied with the Bethlehem hot- and cold-rolled sheets they need to keep their production lines flowing.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

Dec. 20, 1956—Vol. 178, No. 25

The IRON AGE

Digest of the Week in Metalworking

Starred items are digested at right.

THE IRON AGE, published every Thursday by CHILTON CO., Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies, 50¢. Annual Review Issue, $2.00. Cables: "Ironage," N. Y.

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Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

HOW NEW STEEL MERGER WILL AFFECT COMPETITION P. 38

Big question is whether change will lessen or tighten competition. Major reason for acquisition is to establish Bethlehem in Midwest. But Justice Dept. acts to stop proceedings in court test. It it goes through, speculation is whether it will start wave of other mergers.

INDUSTRIAL TRUCKS: GAS OR ELECTRIC? P. 41

Gas driven vehicles are enjoying a 5 to 1 sales ratio but users are finding

that electric units have long range maintenance economy. Both show substantial increases.

WHY FOREIGN AID WILL BE MORE COSTLY P. 57

Congress and the Administration are sympathetic to oppressed areas of Europe. Chances are requests for foreign aid spending won't be pared drastically.

VARIETY OF PRODUCTS SHARE WEST'S EXPANSION P. 59

Wide range of equipment made or assembled in the Farwest means a broadening in metalworking's base there. Fisher Body Div. plans enlargement of its facilities.

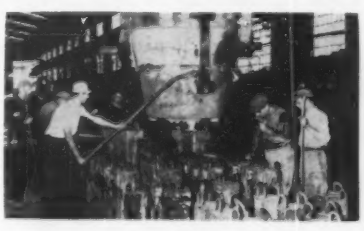
◀

ARBITRATION is now final settlement of nearly 90 pct of all grievance disputes. But it takes more than honesty to make a good arbitrator. In this week's Special Report (p. 35), veteran arbitrator Theodore W. Kheel gives the lowdown on arbitration, its assets and limitations.

NEXT WEEK:

ARE REDS MAKING HEADWAY IN WORLD STEEL RACE?

The free nations still dominate the world steel picture. Russia and the satellite nations are making some progress. But with the U. S. expanding at a rapid pace, it looks as though the free world will hold onto its advantage for a while.



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Exothermic Ferrochromium
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averts plant shutdown with two-hour delivery

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"Rescue" service, illustrated by this actual case, is only one of the valuable jobs performed by independent distributors of Armco Steels across the country. Even more important, they feed steel to the many thousands of small manufacturers so necessary to the healthy growth of the American economy. Big companies benefit, too, from prompt, efficient warehouse service.

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Indexed in the Industrial Arts Index and the Engineering Index.

ABP NBP

EDITORIAL

This Is The Time For Joy

◆ SURE THERE IS A LOT of misery and strife in the world. There always has been. It is our job to do what we can to make it less of a burden upon others and upon ourselves. It is not our job to be a killjoy with a long, long face.

The Christian and other God-given religions take this time of the year to be a joyous one. One that holds out hope for people, for nations and for ideas. The general idea is that some day man will be a little kindlier towards man.

This may be the time to take a good look at our business demeanor. How does it tally with what we really believe? Where does it fit in relation to our family? Are we acting in unison with our ultimate purpose; if we have one?

Is our thinking about our world allies based on emotion or upon the cold hard fact that all nations and individuals falter, make mistakes and often show a weak side? Certainly we and our country are not free from this human pattern.

Many ask, how can we be joyous when times are tough, when the Hungarians and their freedom are bathed in blood, when nations committed to peace attack each other? The truth is that no matter what faces us and no matter how bad things become, there is always room for hope, for good cheer and for laughter.

There are grave problems ahead for our country, for us individually and for our economy. But they are hardly more challenging than those of 1776 and 1930. A man who envisioned our progress in 1776 would have been locked up as a maniac.

Deep in 1933 anyone who even suggested that we would be as fabulously "well-heeled" as we are today would have been looked upon as an idiotic pollyanna. Today there are many who believe that we are in for trouble, loss of character and are headed toward decadence. They may be right. We won't know—most of us—because we will be gone to our Maker long before the historians battle that argument to a conclusion.

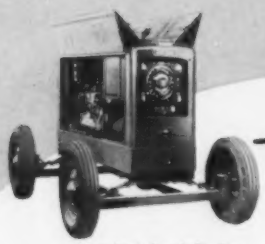
For the next week or so, banish the gloom, the business problems, the world tensions, and realize that we are a lucky people. If we can, let's dedicate the season to Him who keeps things going.

We have good reason to be joyous!

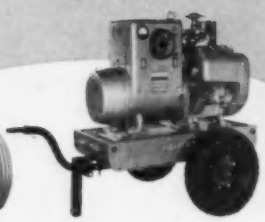
Tom Campbell

EDITOR-IN-CHIEF

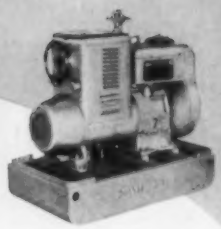
Contractor's Special



Standard Road Trailer



AC Welder/AC Power



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dear editor:

letters from readers

Out of Bounds

Sir:

In a previous letter I stated that I read every one of your editorials in THE IRON AGE. Some have, of course, a greater impression on me than others. It so happens that the one in the Nov. 29 issue, "How About Our Own Fences?" stands out as one of your unusual contributions to our national problems —it is a great thing when an editor can step out beyond the bounds of an industry.

Accept my best wishes for a happy holiday season and many years more of the kind of service you render not only to all of the readers of THE IRON AGE, but to the citizens of this great country. *S. L. Gabel, Superior Tube Co., Norristown, Pa.*

New Ore Shipper

Sir:

We wish to refer to your feature article "Iron Ore: Steel Demand Calls For Higher Imports."

We found it very interesting and to the point.

Our organization owns and presently develops a high grade iron ore deposit at Acari, Peru. We expect to start shipments during the latter part of 1958. *A. H. Gordon, Pan American Commodities, S.A., New York.*

No Fabricator

Sir:

We are always delighted to find an article in IRON AGE that discusses services performed by steel warehouses — and particularly when some mention is made of U. S. Steel Supply Div. and its warehouse facilities.

However, when we read the article "Are Warehouses Steel's Top Customer" in the Nov. 29 issue, we were shocked when we saw the illustration and caption which conveys the idea to customers that we are also in the business of fabricating steel.

This is most unfortunate as we are definitely not in the fabricating business (except reinforcing bar sections), nor do we have any intention of going into competition with our customers. The fabricated sections that appeared in the photograph are bar racks for our own plant that were being moved into position by an overhead crane. *L. E. Olson, Asst. Mgr., Advertising—Market Development, U. S. Steel Supply Div., U. S. Steel Corp., Chicago, Ill.*

A Must For Inspectors

Sir:

Our Chief Inspector found your article, "How to Get More for Your Inspection Dollar" very interesting and educational, so much in fact, he would like to have all his inspectors read it.

In view of this therefore, would you please send us five copies of this article, as soon as possible. *M. J. Lazette, Personnel Mgr., The Toledo Pipe Threading Co., Toledo, Ohio.*

"You should complain—do you know how long I've been stuck in the same old job?"

fatigue cracks

Is This Strike Necessary?

Believe it or not you can buy a book called "How to Win an Argument." We haven't read it and probably won't because we don't think the average guy can win an argument. Time was—before World War II—when industrial arguments over grievances usually wound up as wildcat strikes. The cost of these strikes came out of our pockets—yours and ours. Or, as the economists like to call us, "The Consumer." We paid.

Some 30 years ago a group of men concluded that a lot of industrial strife and court cases could be avoided. They reasoned that this could be done if people agreed —before the trouble—that they'd settle their disputes by *arbitration.*

Slow catching on

These people had the support of men like Chief Justice Charles Evans Hughes, Charles M. Schwab, Felix Warburg. Still the idea of arbitration on a mass basis didn't click until after World War II, some 20 years after the American Arbitration Association was formed. Today only about 10 pct of all the collective bargaining agreements in the country are lacking arbitration clauses. This means that there are still some 10,000 such contracts that don't include arbitration as the final step before the strike or the lockout.

To take you back of the scenes and show you some of the problems of the men who do most of the labor arbitration is the purpose of this week's cover story.

Arbitrator's problems

This year alone, some 200 professional arbitrators will have settled some 10,000 grievances—grievances which could otherwise have meant strikes. Which, as we started to say at the top of the page, cost money.

That's why the editors buttonholed Ted Kheel, one of America's best known and certainly the most photogenic of arbitrators, for a personal story on this subject. In the article (p. 35) you'll read of some of the problems an arbitrator faces. And, if you are not in industrial relations, you may learn something about what it is and how it works.

ARBITRATOR T. W. Kheel, shown here at press conference (upper right), is one of top men in this new field.

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This ultra-modern head . . . CHARTS and PRE-SELECTS PROPER SPEEDS and FEEDS

You chart, you control, you speed up operations and have a record for reference with this advanced head. The prescheduling chart plans sequence of operations and is a complete guide for the operator. Instant, quiet, hydraulic selection and changes of 36 speeds and 18 feeds are preselected by two convenient, easily read dials. Controls for clamping of column, arm and head, and arm elevation by power are at the operator's finger tips.

Built in 4 foot to 8 foot arm, 13 inch to 19 inch column. Spindle speeds may be as low as 8 RPM or as fast as 2300 RPM.

Write for Bulletin R-33 describing this ultra-modern tool

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dates to remember

JANUARY

American Electroplaters Society—Winter meeting, Jan. 12, Sheraton Penn Hotel, Pittsburgh. Society headquarters, 445 Broad St., Newark 2, N. J.

Institute of Scrap Iron & Steel, Inc.—Annual convention, Jan. 13-16, Eden Roc and Fontainebleau Hotels, Miami Beach, Fla. Society headquarters, 1729 H St., N.W., Washington, D. C.

Society of Automotive Engineers, Inc.—Annual meeting, Jan. 14-18, The Sheraton-Cadillac and Statler Hotels, Detroit. Society headquarters, 29 W. 39th St., New York.

EXPOSITIONS

American Society for Metals—March 25-29, Los Angeles.

American Foundrymen's Society—May 6-10, Cincinnati.

The Society of Plastics Engineers, Inc.—Annual national technical conference, Jan. 16-18, Hotel Sheraton-Jefferson, St. Louis, Mo. Society headquarters, 34 E. Putnam Ave., Greenwich, Conn.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 17-18, Palmer House Hotel, Chicago. Assn. headquarters, 79 W. Monroe St., Chicago.

Malleable Founders' Society—Semi-annual meeting, Jan. 18, Hotel Cleveland, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

Compressed Gas Assn., Inc.—Annual meeting, Jan. 21-23, Waldorf-Astoria, New York. Society headquarters, 11 W. 42nd St., New York.

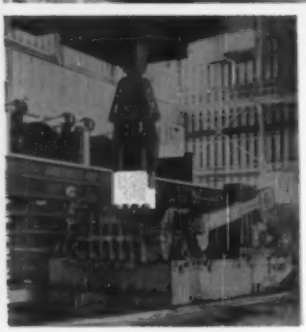
American Standards Assn.—Gaillard seminar on industrial standardization, Jan. 21-25, Engineering Societies Bldg., New York. Society headquarters, 70 E. 45th St., New York.

American Boiler Manufacturers Assn., & Affiliated Industries—Mid-winter meeting, Jan. 22, Hotel Statler, Cleveland. Assn. headquarters, 1571 W. 117th St., Cleveland.

Industrial Heating Equipment Assn., Inc.—Annual meeting, Jan. 28-29, The Shoreham Hotel, Washington. Assn. headquarters, 1145 19th St., N.W., Washington, D. C.

Cutting Tool Mfrs. Assn.—Annual meeting, Jan. 29, Detroit Yacht Club, Detroit. Assn. headquarters, 416 Penobscot Bldg., Detroit.

READY



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Surface®
STEEL MILL EQUIPMENT

No. 17 Billet Shear. Capacity, 10" rounds or 9" squares, 6 strokes per minute.

"Buffalo" Billet Shears are built in 11 sizes to handle *your* size rounds, squares or flats. The smallest one shears thirty 2¼" rounds per minute; the largest, six 10" rounds per minute. Rigid arc-welded steel plate frames —"power" lubrication—air operated clutches, counterbalance and hold-down—are some of the "Q" Factors* that assure you years of service with practically no maintenance.

a "Buffalo" billet shear did it all in 10 minutes!

You're looking at a hundred 7" square billets readied for forging in just ten minutes by a "Buffalo" No. 15 Billet Shear with automatic feed table and back gage. This is just a sample of the high output of "Buffalo" Billet Shears in the nation's leading shops.

And note the clean, square faces of each cut. There's no smearing to conceal porosity, as with burning or sawing. The shear penetrates only $\frac{3}{16}$", localizing a neat, accurate vertical fracture. Divisions are uniform in dimensions and weight. Your quality keeps up with your speed!

Write for Bulletin 3295-C for all details.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

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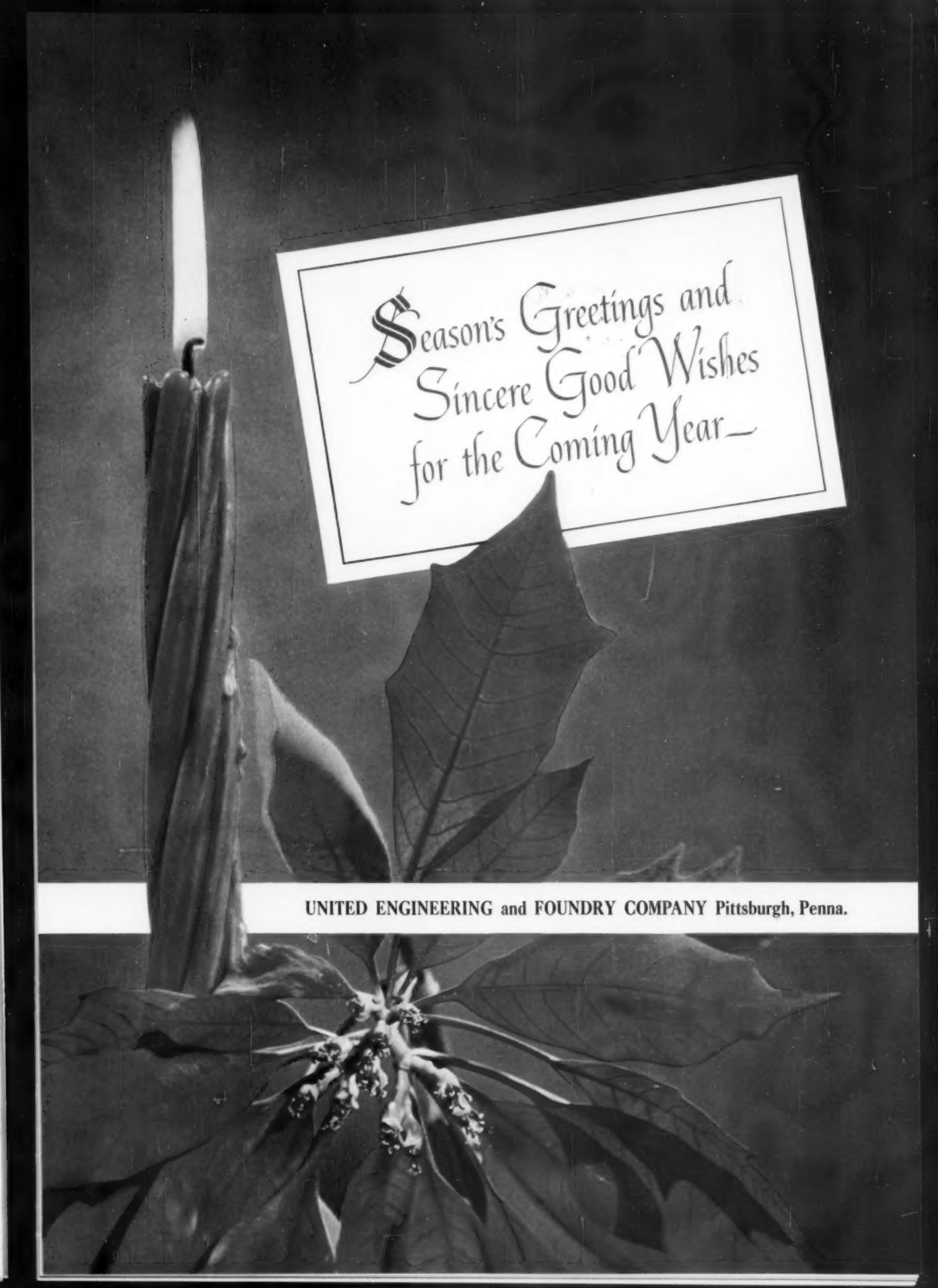
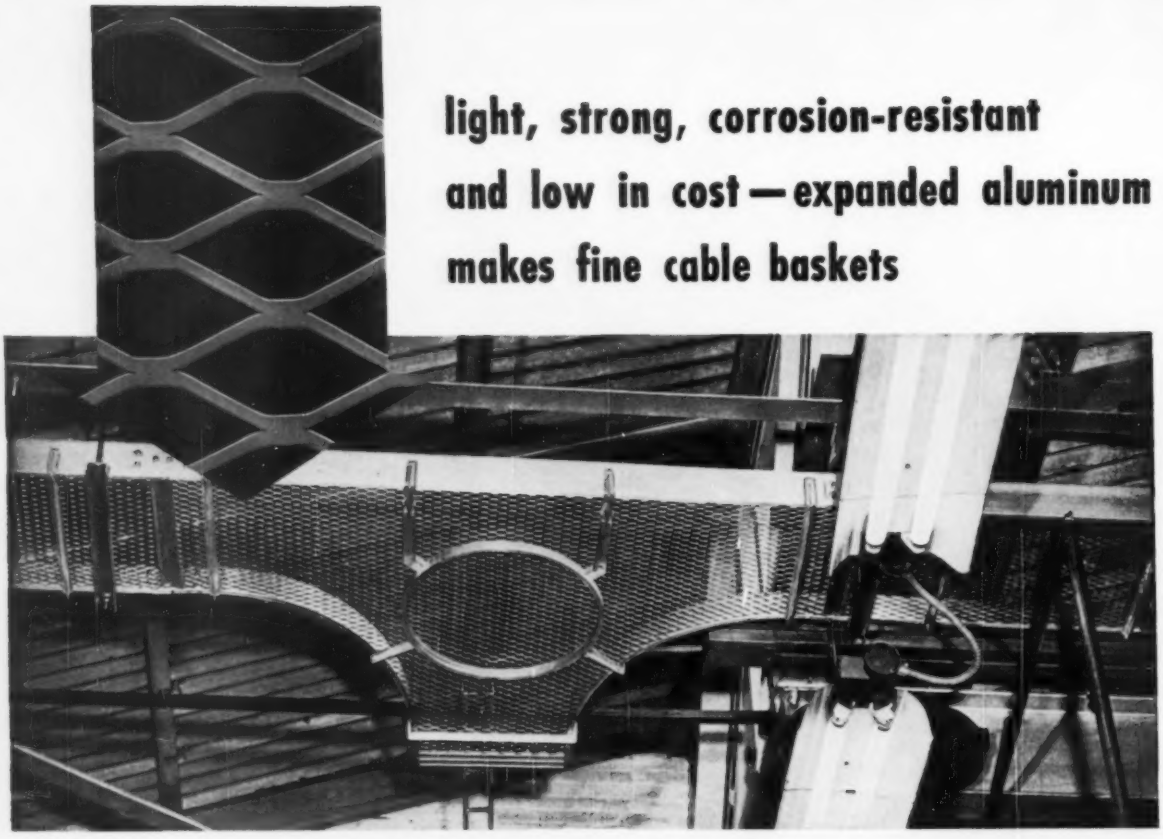


light, strong, corrosion-resistant and low in cost—expanded aluminum makes fine cable baskets



Add up the advantages of Penmetal expanded aluminum and you can see why Husky Products, Inc. uses it for their line of cable baskets.

The extreme lightness of expanded aluminum . . . 80% lighter per square foot than the original sheet . . . makes the baskets easy and economical to handle and erect. Yet with plenty of strength to take the weight of the cables—thanks to the diamond truss pattern.

Corrosion-resistance makes for durability; sustained clean appearance. Low cost means large areas can be covered economically. Finally, expanded aluminum is easily cut or shaped or welded.

Cable baskets are another example of the profitability of Penmetal expanded aluminum. Take advantage of it in your designs and in your selling. Further details? Ask for folder 507-EM.

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Plant: Parkersburg, W. Va.

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METAL MARK Penmetal 1869 OF QUALITY

PM-105

The Baskets in the photos carry electric cables in power plants, industrial installations, etc. They were made from Penmetal ¾" flattened expanded aluminum—by Husky Products, Inc., Cincinnati, Ohio

The Best

Standardized gearing in stock . . .

are the easiest

housing sub-assemblies in stock . . .

to get

and standardized pinions in stock . . .

mean faster deliveries from stock!

FOOTE BROS.
LINE-O-POWER SPEED REDUCERS

Standardized interchangeable gearing – by Foote Bros. – lets you specify and get the particular reducer you want, in the quantities you need, direct from stock! Duti-Rated Lifetime Gearing in a complete range of interchangeable sizes, ratios and capacities are stocked and ready for assembly. Capacities range up to 200 H. P., ratios to over 2700 to 1. Standard foot and flange type cast housings are stocked, too, for straight or right angle drives. The drives you want are assembled from stock components and shipped as soon as your order is received. For a complete index to the almost endless variety of Line-O-Power reducers immediately available, write for your copy of the Line-O-Power catalog today. See for yourself how you can get more for your drive dollar . . . faster!

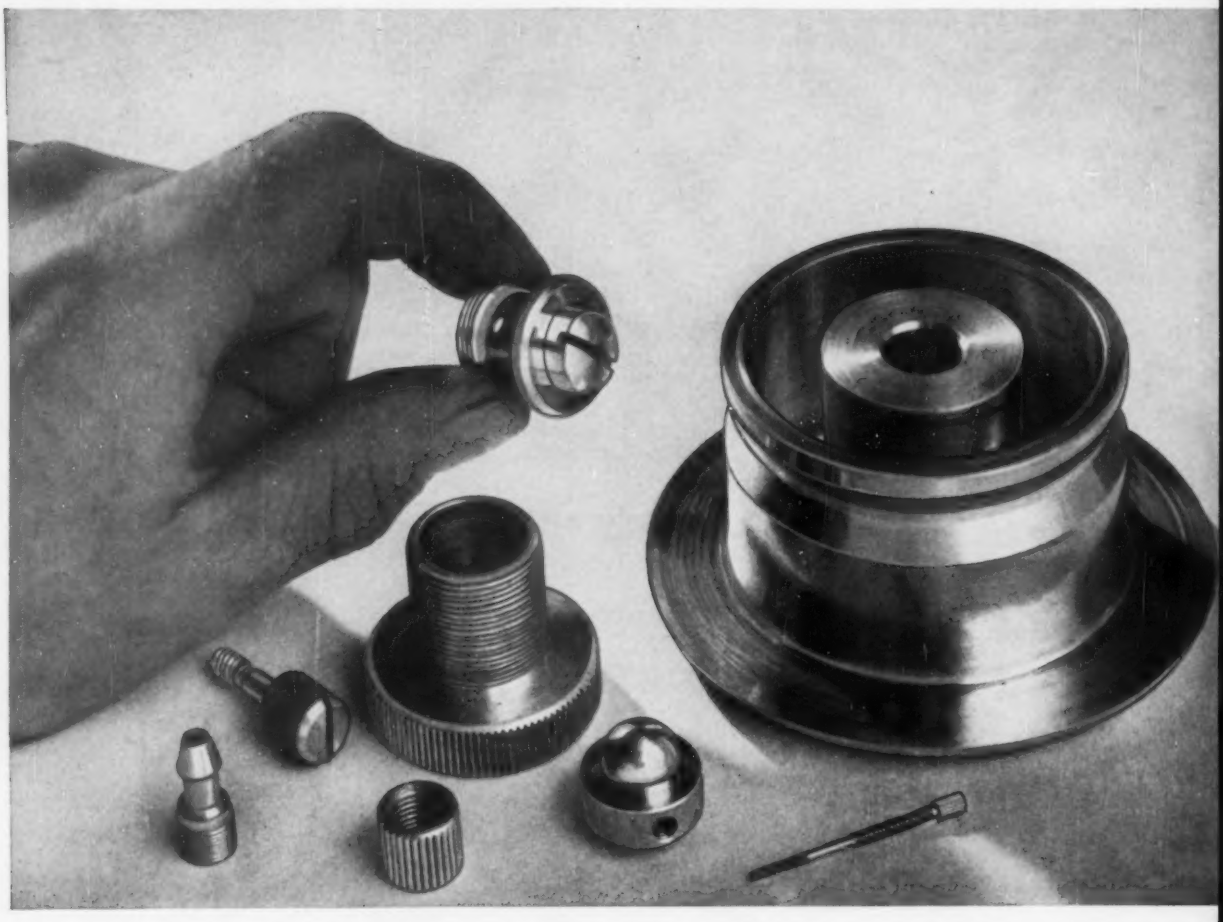
This trademark stands for the finest industrial gearing made!

T. M. REG. U. S. PAT. OFF.

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
4545 South Western Boulevard, Department M, Chicago 9, Illinois



Typical parts machined by Taylor Instrument Companies from Alcoa Aluminum Screw Machine Stock

HOW TAYLOR INSTRUMENTS* GET A LIFT AND A LONG LIFE FROM ALCOA SCREW MACHINE STOCK

Where measurements must be precise, you'll find Taylor Instruments . . . insuring a jet pilot's safe descent by parachute . . . warning a ship's captain of changing weather . . . telling the doctor your temperature and blood pressure. In everyday life, and in thousands of industrial plants, Taylor Instruments have helped America measure its progress since 1851.

What are Taylor's requirements for screw machine parts? Precision, naturally. Corrosion resistance is also important since many Taylor Instruments are installed where maintenance is virtually impossible. Because many Taylor products, like your home thermometer, are mass-produced, cost is exceptionally important in the selection of a screw machine stock.

With these requirements in mind, read why Taylor Instrument Companies use Alcoa® Aluminum Screw Machine Stock. See if their experience plus the inescapable economics of aluminum versus brass doesn't dictate a hard look at all your screw machine parts. For competent technical help in making such an analysis, simply call your local Alcoa sales office listed under "Aluminum" in your classified phone book. Aluminum Company of America, 870-M Alcoa Building, Pittsburgh 19, Pennsylvania.

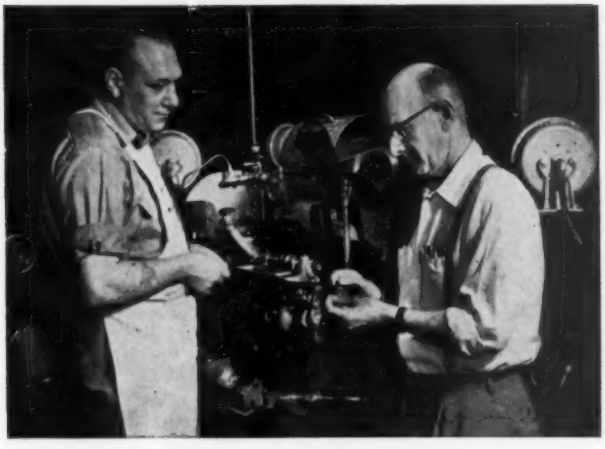
*Taylor
INSTRUMENT COMPANIES

IN PURCHASING

Asst. Purchasing Agent, J. R. Mahan, says, "Dependability is the single most important requirement of a supplier. This we get in full measure from Alcoa. Quality has always been dependable. Deliveries have come when promised. Service and technical help are always available to us and their answers are right. We find this Alcoa dependability also applies to Alcoa distributors from whom we get prompt delivery."

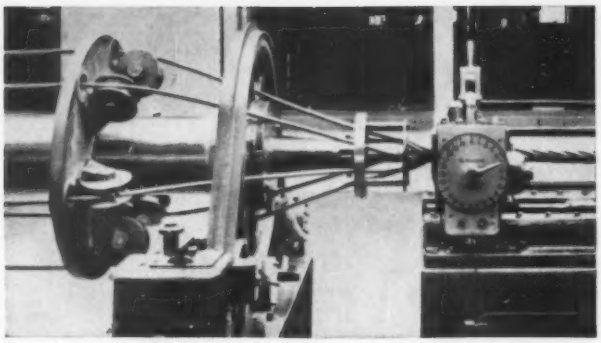
IN METHODS ENGINEERING

H. D. Klitgord, Manager, Methods Engineering Department, says, "We have a continuous cost study of materials for all of our screw machine parts. Equal or better performance has been our criterion in every instance where money could be saved. We are saving $100,000 per year by using aluminum. Our conversion at present is about 40% and we anticipate an increasingly greater use of aluminum bar stock."



IN PRODUCTION

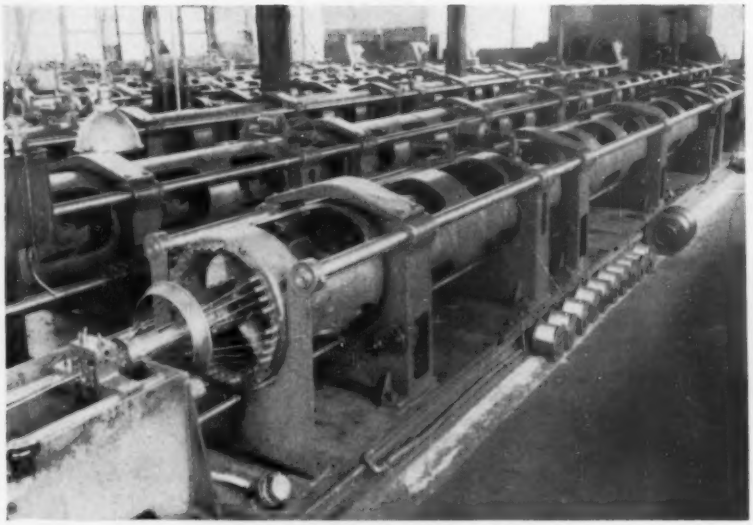
Mr. H. Bubel, Group Leader, Automatic Screw Machine Department, says, "We are machining aluminum at the maximum production rates possible. Alcoa technical people have been of great assistance to us in recommending cutting oils and tools, and helping us maintain our close tolerances and fine finishes."



This machine is capable of "closing" strands to make wire rope up to 3½-inch diameter. Six strands are closed around a core of either fiber or wire rope.

YOUNGSTOWN "YOLECTRO" ROPE WIRES

. . . built-in strength and safety keep your wire rope quality high



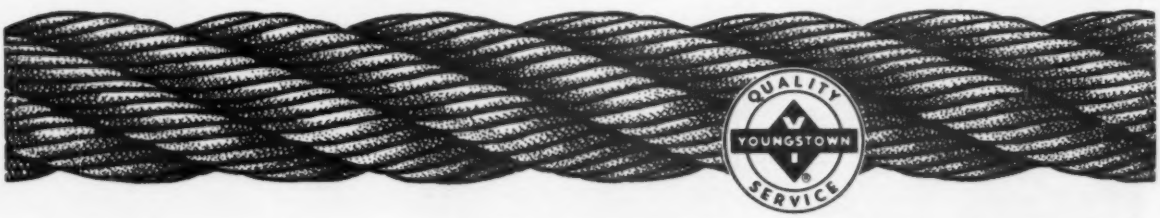
This bank of rotary stranding machines are busy producing wire rope at the St. Louis plant of H. K. Porter's, Leschen Wire Rope Division. Coils of wire are set in the open bays of the machines and conducted to the closing dies along the circumference of the barrel. They form from 7 to 61 wires into strands which are "closed" into a wire rope. Usually, finished wire rope consists of 6 or 8 strands closed around a core.

Wire rope must give long, trouble-free service or it's definitely a bad investment—both from a cost and a safety standpoint. To maintain their product quality, leading rope manufacturers specify Youngstown Yolectro High Carbon Rope Wire because it offers:

- Toughness and Strength
- Abrasion Resistance
- Gage Uniformity
- Proper Flexibility

Yes, this special, quality-controlled Youngstown wire provides the correct balance of properties to meet your most critical requirements. Why not make it your specification? It's available in both Bright and Galvanized finishes in all high carbon grades.

For additional information or metallurgical assistance, write or phone today to your nearest Youngstown District Sales Office.



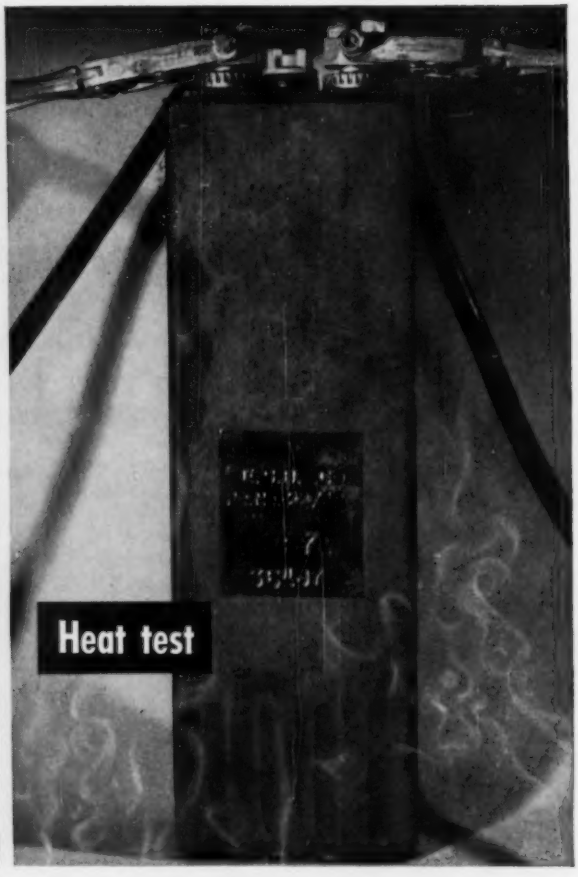
THE YOUNGSTOWN SHEET AND TUBE COMPANY

General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

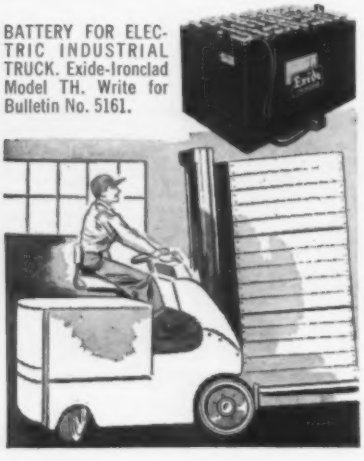
Producers of Quality Carbon and Alloy Steels for Over Half-a-Century

EXIDE-IRONCLAD BATTERIES

For electric industrial truck operation



Deliver the power over a wide range of temperatures



BATTERY FOR ELECTRIC INDUSTRIAL TRUCK. Exide-Ironclad Model TH. Write for Bulletin No. 5161.

At few places on earth do storage batteries ever encounter such extremes of cold and heat as are used to test Exide-Ironclad Batteries in the laboratory.

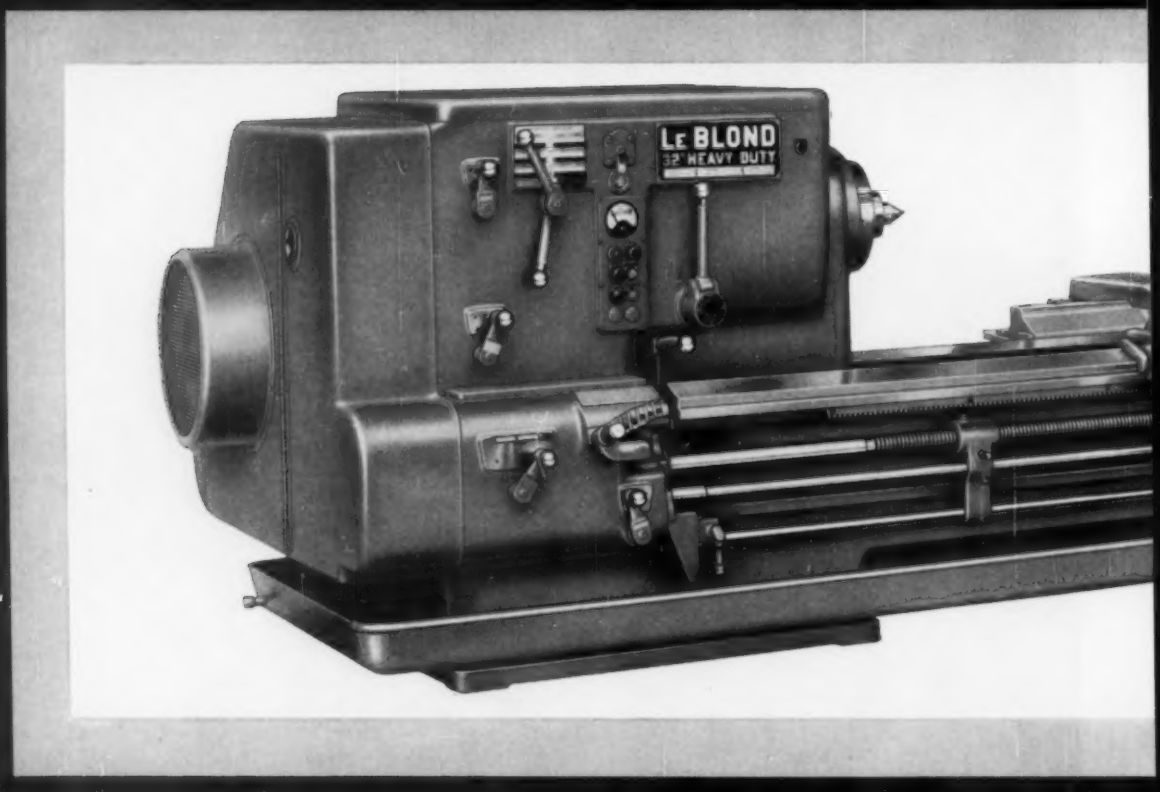
These tests prove that Exide-Ironclad Batteries can be depended upon over a wider range of temperatures than they are ever likely to be asked to endure. And they provide tangible extra assurance of dependability at all the more normal operating temperatures.

Extreme temperature performance is especially important when a battery must have continuous dependability. It is often at these extremes that a battery is most needed. And a battery cannot be called dependable unless it can be counted on every day—all of the time.

The high and low temperature performance of Exide-Ironclad Batteries is a direct result of their unique construction features and special engineering. In countless applications, these batteries have earned an unmatched reputation for long life and high capacity. When you need batteries for heavy duty uses, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

LeBlond 25" Heavy Duty Lathes
LeBlond 32" Heavy Duty Lathes (shown)



for today's toughest

power

rigidity

convenience

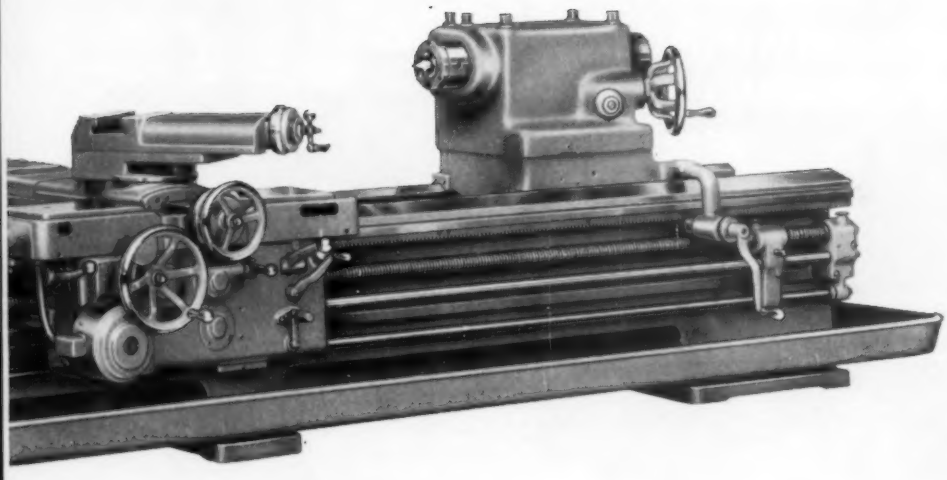
safety

50 hp on the 25″, 60 hp on the 32″. Here's proof of efficiency—maximum no-load friction hp on the 32″ is only 3.4 hp @ 500 rpm.

High-capacity 4-bearing spindle. One-piece double-wall apron. Heavy, short shafts; hardened and ground gears. Hardened and ground compensating steel bed ways.

4-directional power rapid traverse, controlled with a single lever. Direct-reading, color-keyed speed change levers. Single-lever feed control.

Adjustable torque to bring heavy work pieces up to speed safely. Similar adjustments for stopping and jogging.



turning

... cut with confidence

LeBLOND of Cincinnati

THE R. K. LEBLOND MACHINE TOOL CO., CINCINNATI 8, O.

World's Largest Builder of A Complete Line of Lathes for More than 70 Years

New Republic

REPUBLIC NYLOK NUTS offer advantages similar to those of Nylok bolts. They can be assembled from either end with hand or power tools, and lock tight wherever wrenching stops. Holding power is not affected by vibration. "Plastic memory" of nylon pellet gives Nylok nuts excellent adjustment and re-usability characteristics.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Self-Locking Nylok Bolts

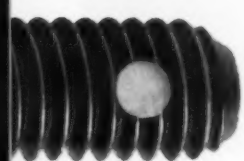
Provide Single-Unit Answer to Vibration, Liquid-Sealing and Adjustment Problems

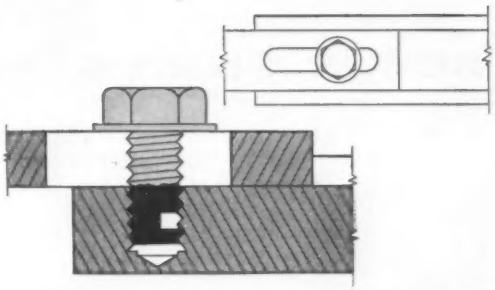
If your bolted assembly must be vibration-proof, liquid-tight or adjustable—Republic Self-Locking Nylok® Bolts are your best fastener selection. You simply align parts to be fastened and turn Nylok bolt into threaded hole. A positive lock is provided, whether or not the unit is seated.

In addition, use of Nylok bolts eliminates lost motion of assembling extra locking devices or expensive wiring. They can be hand wrenched or power driven to minimize fastening time—a tremendous asset in high-volume production runs.

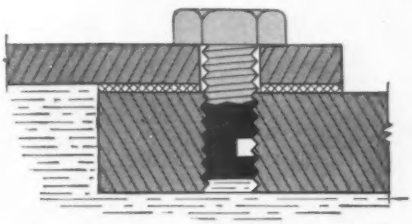
Locking is accomplished by means of a permanent nylon insert in the body of the bolt. This pellet wedges opposite mating threads together to form a vibration-proof lock. There is no damage to threads or seating surfaces, and the insert's resiliency allows fasteners to be adjusted and re-used repeatedly. Further, when properly seated, the nylon insert effectively blocks fluid flow around the helix of the threads. Even relatively soft materials can be locked to a threaded member using Nylok bolts.

When you specify Republic Nylok Bolts you secure the double protection of Nylok locking plus Republic quality, built into each fastener from raw ore to finished product. To find out how you can take full advantage of this ideal combination, contact your Republic representative. Or mail the coupon for further information.

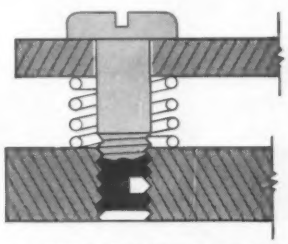




ADJUSTMENT problems like this movable plate are readily solved using Nylok bolts. The nylon pellet allows bolt to be backed off and wrenched tight time after time, without damage to threads, seating surfaces or holding power. Unaffected by age, immune to fungus, pellet won't dry out or shrink.



LIQUID SEALING properties of the Nylok bolt are demonstrated here. Nylon pellet, seeking to regain its original shape, effectively interrupts space between non-loadbearing surfaces of mating threads. Escape of fluid along helical thread path is blocked. Nylon's resistance to moisture and ordinary solvents assures permanence of seal.



VIBRATION has no effect on the locking characteristics of Nylok bolts, even when not wrenched tight as shown here. Secure grip is provided by nylon pellet permanently imbedded in fastener body. Continual pressure of resilient nylon forces tight metal-to-metal lock between mating threads opposite the pellet.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-2704
3104 East 45th Street,
Cleveland 27, Ohio

Please send me further information on Republic Nylok Bolts and Nuts.

Name_____ Title_____

Company_____

Address_____

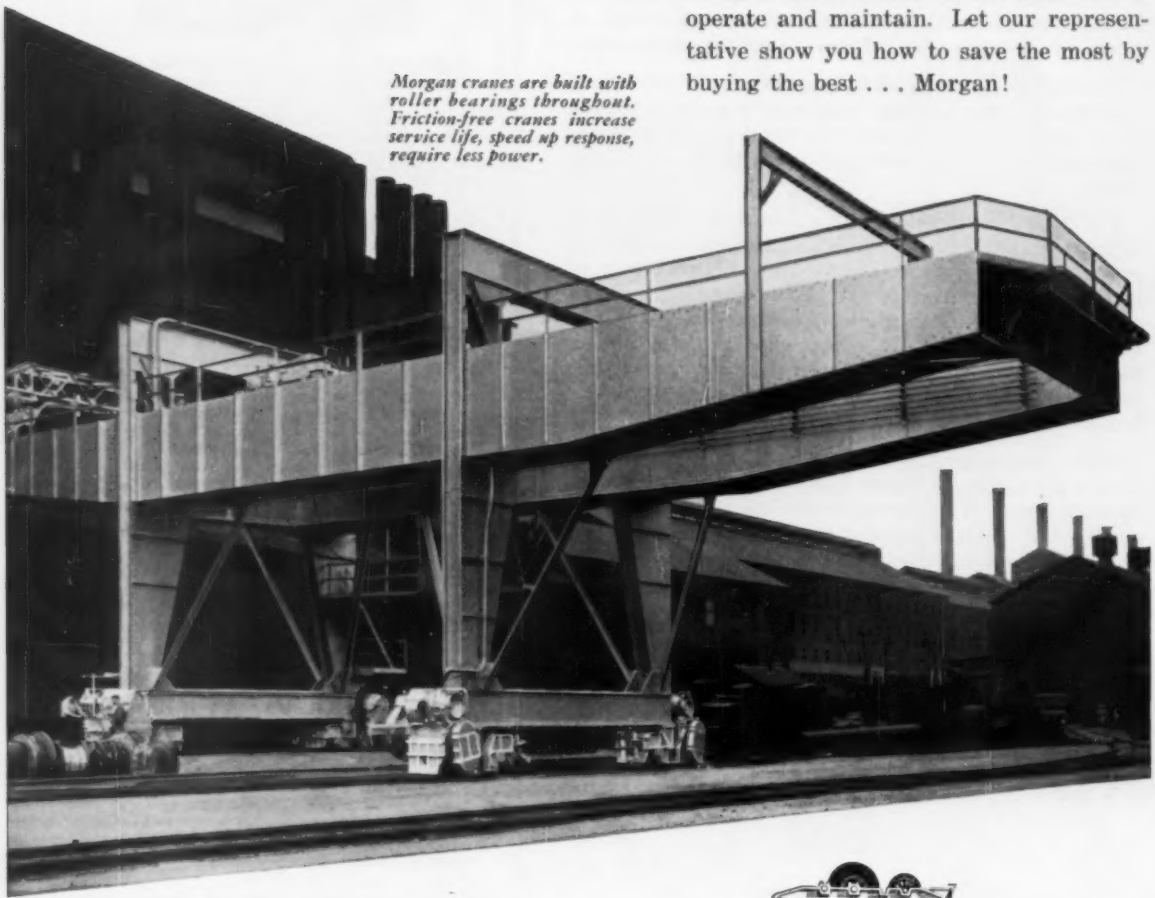
City_____ Zone____ State_____

How Morgan keeps cranes "rolling"

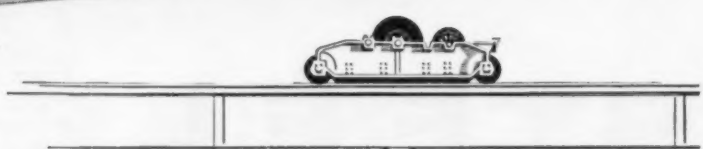
• MORGAN "Anti-Friction Engineering" keeps cranes rolling by providing precisely correct bearings and mountings for eash specific application . . . your assurance of longer trouble-free operation, lower maintenance costs.

"Anti-Friction Engineering" is another vital link in the chain of features that makes Morgan cranes best in the business.

Performance records prove that advanced design and heavy duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



Morgan cranes are built with roller bearings throughout. Friction-free cranes increase service life, speed up response, require less power.



The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

BLAW-KNOX makes what it takes

for continuous, mechanical chipping

The Continental Chipper with auxiliary equipment is a complete mechanical system for sorting, handling, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

50th Anniversary
BLAW-KNOX
1906-1956

BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Fasten it with STAINLESS STEEL

for Better Looks—Longer Life

LEADING PRODUCERS OF FASTENERS USE

AL STAINLESS

A complete line of stainless steel fasteners—all types and sizes of bolts and nuts, rivets, wood and machine screws, cotter pins, washers, etc.—are made of AL Stainless Steel by the leading manufacturers in this field. Get in touch with them for catalogs and prices, or write us direct.

ADDRESS DEPT. A-841

AL Stainless Steel fasteners are non-rusting, non-staining. They will last as long as, or longer than, the materials they join. You can count on them to stand up through the years—both in strength and in bright good looks.

Best of all, stainless steel fasteners can be used anywhere. It isn't necessary that the materials to be joined are stainless—these corrosion-proof fasteners are the perfect answer for joining other metals, woods, or plastics. Fasteners made of AL Stainless by leading manufacturers are produced in complete variety—every type and size that your job requires.

For improving quality and reliability wherever they're used—and for the economy of lifetime service—specify fasteners made of time-tested Allegheny Ludlum Stainless Steel. ● For fabricators' names and any technical data or engineering help in the use of stainless steel, address *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

Make it BETTER-and LONGER LASTING-with

AL Stainless Steel

AL ALLEGHENY LUDLUM ®

WAD 5665 **Warehouse stocks carried by all Ryerson Steel plants**

McKay

High Production Draw Benches

Here's greater cold draw production at a substantially reduced cost! McKay's line of rugged, precision built equipment is designed to meet and exceed today's accelerated demands.

FOR EXAMPLE; Integral, centerline push pointing provides smooth flow and eliminates a costly operation. Die blocks and pusher blocks are retained in machined ways, eliminating bolts and facilitating change over. Carriage return speeds are stepped up, allowing more productive time in the draw cycle. Automated lines are possible merely by addition of standard units already proved and in operation.

You'll profit by calling a McKay sales engineer.

THE McKAY MACHINE COMPANY

Youngstown, Ohio

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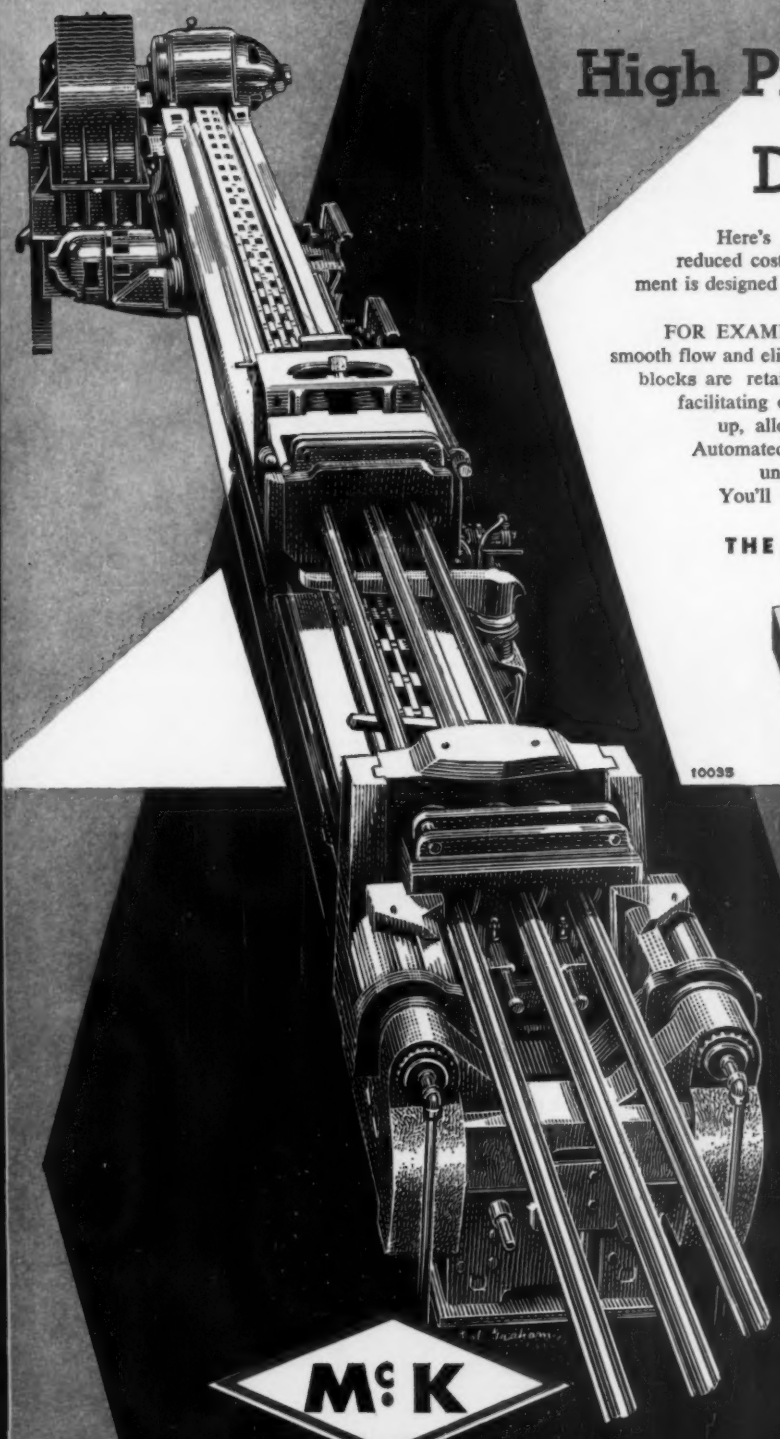
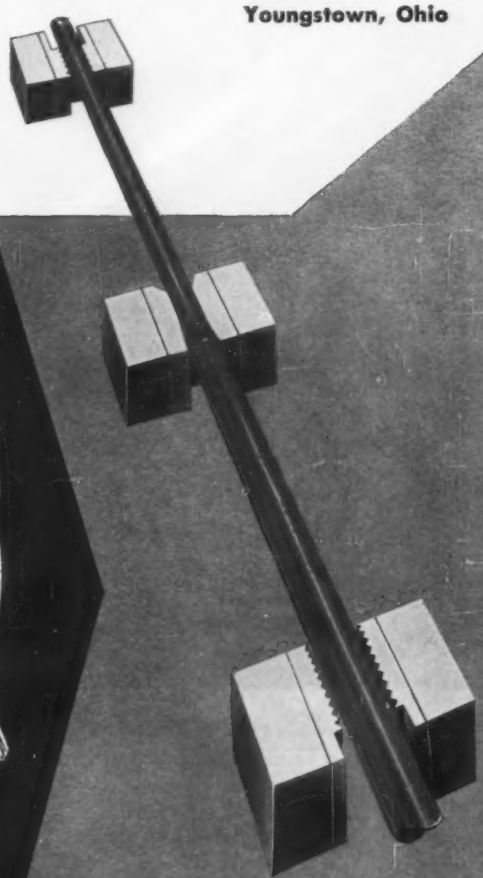




McK

SETTING THE STANDARDS OF QUALITY METAL WORKING MACHINES FOR TWO GENERATIONS

They may Seem the same, but...

American is the name!

However you calculate it, your true fastener cost contains four things:

1. price **3. quality**
2. service **4. research**

Occasionally, you may find local price differentials you think may be worth your while. But no one gives you more of all four than American.

AMERICAN GIVES YOU MORE OF ALL FOUR

In service, with a tightly-knit system that meets the needs of the most intricate production lines. Like an appliance manufacturer who uses 120 million American Phillips fasteners a year.

In quality, with a unique quality control program that includes such protection for you as statistical sampling on production runs.

In research, which produced not only the Phillips Head fastener, but showed one customer a substantial saving by converting a three-part, assembled machine screw into a single cold-headed unit.

There are many sources of Phillips-type fasteners. But only at American will you find more of the four basic features you want — price, service, quality, research.

Make your own comparisons . . . send us your inquiry for price and delivery or your specifications for special fasteners. Write:

SINCE 1836

American!

AMERICAN SCREW CO. • WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICHIGAN

It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

Empire State Building, world's tallest building.

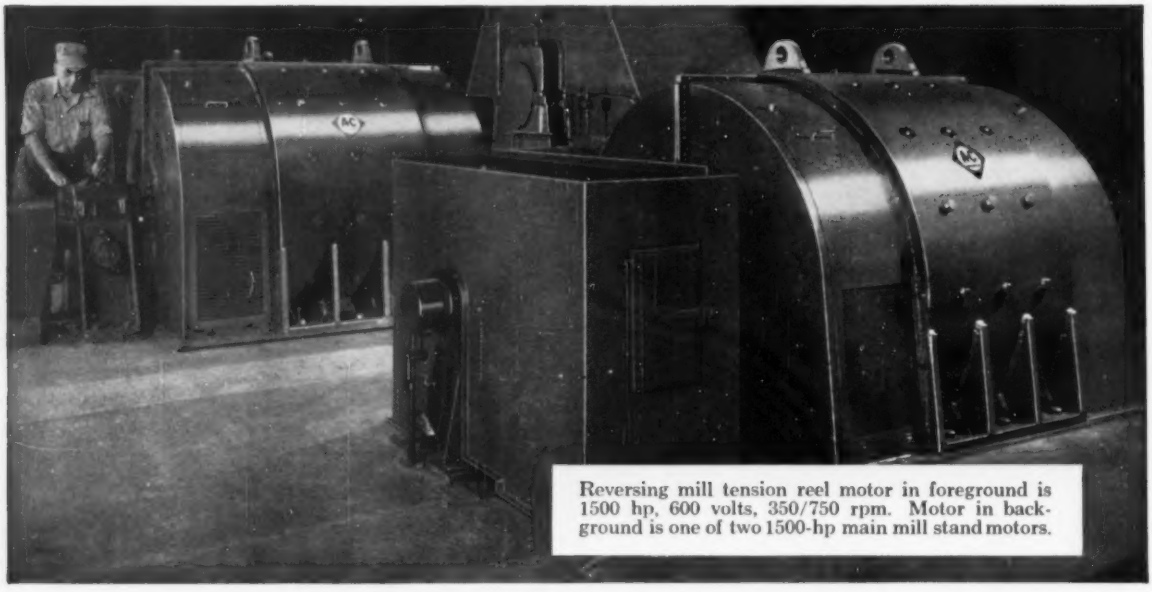
ROEBLING CF&I

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

ALLIS-CHALMERS
MOTORS

Furnishing All Drive Power for New Steel Facilities

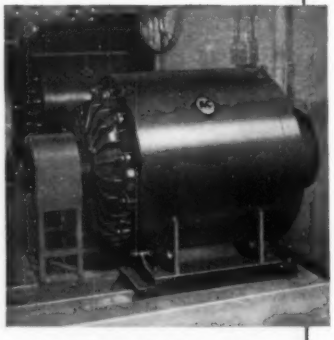


Reversing mill tension reel motor in foreground is 1500 hp, 600 volts, 350/750 rpm. Motor in background is one of two 1500-hp main mill stand motors.

Dependable Allis-Chalmers Motors Play Key Role in Steel Mill Expansion

Expansion recently completed in an eastern steel mill included two new processing lines and a new reversing mill. Allis-Chalmers application-engineered motors furnish dependable, economical drive power for these new specialized steel facilities — helping this major producer attain top steel yield.

For experienced help with *your* expansion or modernization plans, contact your local Allis-Chalmers office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.



Here are Allis-Chalmers 100-hp, tube-type, TEFC explosion-proof cage motors driving pumps in oil room below the reversing mill.

NOW, you get even more winding protection with SILCO-FLEX

all-silicone-rubber motor insulation, available only on Allis-Chalmers motors — in many of the larger sizes. Ask your A-C representative for the facts about this revolutionary new insulation system.

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5033

NEWSFRONT

Steelmakers Seek Escape From Scrap

Record scrap prices are forcing steel companies to take closer looks at anything that will lessen their reliance on scrap. Expansion of blast furnace capacity would be an obvious approach. But another—coming in for a lot of attention—is the H-iron process for directly reducing iron ore fines with hydrogen. End product (see THE IRON AGE, July 12, '56) is furnace-grade metallic iron.

Aluminum For Auto Brakes?

Trend toward smaller auto wheels has aluminum producers happy—they think it may open up important new applications. With braking surface reduced, they feel aluminum drums answer the need for faster heat dispersal. A coating of steel over aluminum would mean combined long wear and good heat conduction. Also talked of: disk-type brakes for smaller wheels.

Army Tests "Safe" Bridge Limits

How safe are Army's prefabricated bridges? Army engineers are finding out with a new machine—basically, a structural frame applying a hydraulic force—which puts on pressures up to 400 tons. It checks top load-carrying capacities and safety margins. Four electronic cells of 100-ton capacity measure loads.

Cycle-Anneal For Flake-Free Forgings

Flaking of large steel forgings is a continuing problem. Bulk of large forgings currently produced are still made from air-melted steels, rather than from steels vacuum-melted to remove gas impurities. To combat flaking in these forgings, one European researcher has resorted to an elaborate cycle annealing program. With low alloy steels, the technique claims to produce flake-free forgings on a tonnage basis.

Auto Facelifts Will Go Deeper

The 1958 model year will undoubtedly be a facelift year for the auto industry. But it will be markedly different from other years—1956 especially. The industry has learned the hard way that the public doesn't want warmed-over versions of older cars. Thus tooling orders placed currently will be much more extensive than they've been for other facelifts.

Missile Buying: Free to Move

Defense Secretary Wilson's decisive assignment of guided missile roles among the several armed services should boost missile buying beyond the $1.2 billion mark expected this fiscal year. Air Force can now push plans to use land-based, 1500-mile-range weapons. And Army, to beef up close-in air defenses, hopes to coax more mileage from its 200-mile Redstone.

New Tack in Fission Thinking?

Is atomic power resulting from ultimate refrigeration of matter possible? Nation's scientists are puzzling over recently-expounded theory that extreme cold (actually zero absolute) conditions can bring about nuclear fission. Theory has it that at absolute zero, electrons would cease their motion and simply collapse into their nucleus, splitting it to unleash energy.

Buyers Reappraise 400 Series Stainless

Price increases now being posted on nickel-bearing stainless steels are forcing many users to take another long look at the nickel-free 400 series. In many cases the price differential for comparable grades is now more than $300 a ton.

Vending Machines Are Big Business

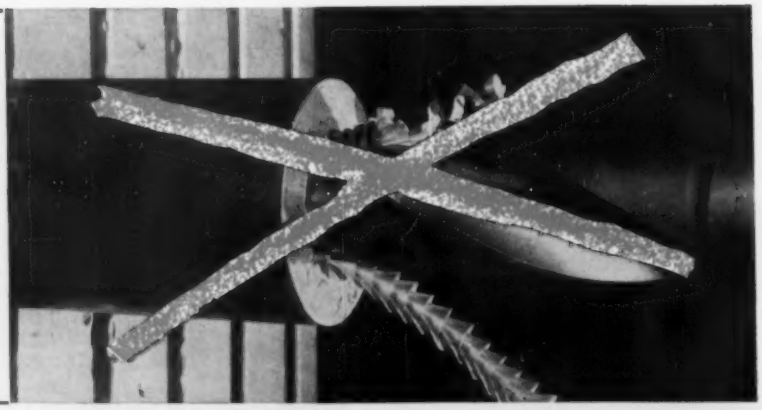
Vending machine business is approaching status of a $2-billion industry. Operators expect to gross $1.9 billion this year from 3.2 million machines. Biggest potential market is the industrial plant. This growing industry provides a good market for electric motors, refrigeration equipment, stainless steel tanks and sheet steel.

Shooting For Bigger Metal Markets

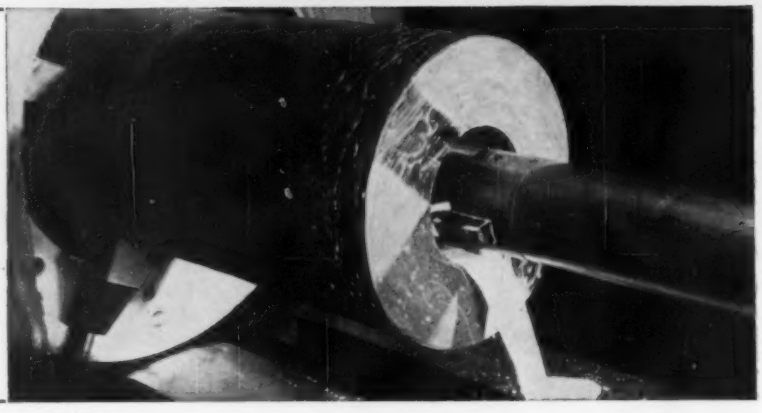
New germanium and selenium rectifiers are compact, dependable, highly efficient and flexible—and their makers think they rate a bigger role in metals. Arc welders and electroplaters are targets among large d-c users. Single rectifiers in the 750 kva range are being built; parallel installations offer outputs to 10,000 kva.

How to save a big step when you make hollow parts...

SKIP
drilling bar stock



START
with finish boring of TIMKEN® seamless steel tubing



WITH Timken® seamless steel tubing as your base stock, finish boring often is your first production operation in making hollow parts. You save a big step because you don't have to bore out the center hole. It's already there! And because Timken seamless tubing eliminates one boring operation, it frees part of your screw machines for other jobs. Result—you add machining capacity *without* adding machines.

And figure in this extra saving. With Timken seamless tubing you get more parts per ton of steel. There's less metal to hog out.

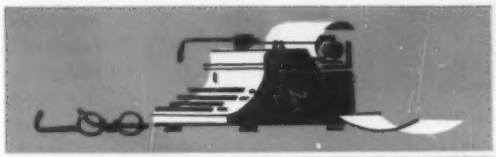
Timken Company engineers will study your problem, recommend the most economical tube size for your hollow parts job—a size guaranteed to clean up to your finished dimensions.

You can get better quality products, too. Manufacture of Timken seamless tubing is basically a forging operation. It produces a uniform spiral grain flow for greater strength—a refined grain structure that brings out the best in the metal's quality. And this quality is uniformly maintained from tube to tube, heat to heat, order to order. Our metallurgists will gladly work with you, show you where Timken seamless steel tubing can save you money. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO."

TIMKEN *Fine Alloy* **STEEL**

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



NEWS SECTION

This . . . or This

Arbitrators: Blessed or Damned?

You'd expect labor judges to lead short harried lives . . . Yet some 200 professional arbitrators handle about 10,000 cases a year—year after year . . . Read why, and see how they do it—*By T. W. Kheel.*

THEODORE W. KHEEL is one of the nation's best known labor arbitrators. He was Executive Director and public member, National War Labor Board, 1944-1945. He also served as co-chairman of a National War Labor Board commission on intra-plant inequities in the steel industry. Recently, he was chosen permanent arbitrator for unions and employers on all public transportation systems in New York City. He is a member of the law firm of Battle, Fowler, Neaman, Stokes & Kheel.

◆ DESPITE THE HAZARDS of one of the newest and smallest professions on earth, industrial relations arbitrators have a working life expectancy about like members of other more traditional professions.

How does arbitration differ from mediation? Where does it stand today? How much influence do these "umpires" have? Why is the profession so small and what are the hazards?

Arbitration is quite new, yet it is now the final step in the grievance machinery of 90 pct of all collective bargaining agreements in the country. It didn't exist during World War II because of government controls, and in the preceding decade (1932-1942) it was hardly used at all. So the past 10 years are the significant ones.

Keeping the Peace

During this year alone a small group of umpires or arbitrators will have made peace in some 10,000 disputes between management and labor throughout the United States.

Since arbitration is voluntary, every decision an arbitrator issues becomes a measuring rod for his

selection in the next case. Unlike a baseball umpire, his working life expectancy is set by either or both of the antagonists whose disagreements he is asked to resolve.

In September 1947 the arbitrators of industrial disputes formed an association, the National Academy of Arbitrators. Its latest roster of members—about 200—shows that most of the same men who were arbitrating 10 years ago continue to handle the lion's share of cases today.

How can you explain this repeated use of the same arbitrators when the field of choice for labor and management is country-wide, and when the possible pitfalls and hurdles for the arbitrators are so many?

I believe there are two main reasons:

1. Arbitration has become a finely ground tool of industrial relations whose strengths and limitations are thoroughly understood by all of its practitioners, the representatives of both sides as well as the men most frequently in the middle. The fear of the unknown has largely been eliminated.

2. The skilled arbitrator not only understands the limits of his authority but generally brings in an award which, even if unsatisfactory as it almost always is to one side or the other, nevertheless falls within the range of what the parties reasonably anticipate.

Companies and unions now know that honesty and impartiality in an arbitrator (indispensable as they are) are not enough. An

MODERN MANAGEMENT SERIES

- This is the sixth of a series of articles on management problems, written for THE IRON AGE by specialists in various management fields.
- Earlier articles were by Eliot Janeway, ("Is Business Cycle Old Hat?"), March 1; Walter J. Semlow, ("How to Grow Management Talent"), May 3; Harold J. Ruttenberg, ("Labor: Small Business Is the Forgotten Man"), July 5; Richard W. Dalzell, ("Diversification: Watch the Pitfalls"), Aug. 16, and Dr. Harry J. Johnson, ("Ten Commandments Of Industrial Health"), Nov. 8. Reprints are still available.

Here's How Arbitration Works

Several years ago, the Federal Pressed Steel Corporation* and the Steelworkers Union agreed that management would have the right to alter established piece rates on certain jobs whenever substantial changes occurred in "equipment, methods of operation, material or quality or production standards."

The negotiators knew that it would take luck to get through the three years of the contract without disputes over application of this provision. But being men of experience in industrial relations, they didn't trust to luck alone. Conforming to the usual procedure in metalworking, they arranged in advance for arbitration of controversies that couldn't be settled in grievance procedure.

The union contract was in effect for no more than eight months when the arbitration clause proved to be a wise bit of foresight. After making a number of minor changes in a job identified as "set-up and tear-down in the press department," management wanted to reduce piece rates "to maintain a fair relationship to other rates in the shop."

The union objected. "We never agreed to changes in piece rates except where the company brings about a basic change in operations," argued the shop steward.

After a month of fruitless discussions, the parties asked the American Arbitration Assn. to put its procedure into motion. Within a week, they received identical lists of arbitrators and, indicating an order of preference, soon found a mutual choice in a man who was not only an acknowledged author-

ONE OF nation's biggest, toughest arbitration jobs is now in Mr. Kheel's lap—permanent arbitrator for New York City transit systems. Here he acts as fact-finder in Transport Workers Union wage case against N. Y. Transit Authority. (TWU photo)

understanding of industrial relations and the arbitration process, too, is necessary.

But let us first look at the safeguards that industry and labor have devised to insure the arbitration process against a rash decision.

The chief one is to limit arbitration to disputes that arise under the contract. These are more frequently known as grievances. Basically, they are claims that a particular right granted or an obligation imposed by the contract has not been honored. The contract will almost always provide that arbitration must be limited to such claims and that the arbitrator shall merely interpret and apply the agreement with no power to add to or subtract from it.

ity in industrial relations but one whose experience included job evaluation and union contract interpretation.

A hearing was promptly arranged, where all evidence and arguments were presented, in line with established rules. Two weeks later, the award and opinion of the arbitrator, which both sides had agreed in advance to accept, was handed down.

The arbitrator found that the company had instituted six changes in methods of operation. While agreeing with the union that no one of the changes alone would have justified re-timing the job and setting new rates, the arbitrator held that, taken together, they had the effect of "loosening" the rate to a substantial degree. His award called for a reduction in piece rates, though not as large a cut as management had asked for.—The Editors.

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*a fictitious name

Today it is fairly widely recognized that arbitration is not as suitable a device for disputes over what should go into the contract. Its limitations are especially apparent in wage disputes. What standards should an arbitrator use in making his decision in such disputes? Prices, profits, living costs, productivity, competitive wage rates all enter the picture. No one has yet had the ingenuity to show how these elusive factors can be intelligently correlated and applied objectively. And no one is very likely to. Most experts readily agree that there is no suitable substitute for collective bargaining in resolving **wage disputes.**

Yet the settlement of **grievance disputes** through arbitration is almost universally accepted and the process is well developed. It includes: (1) Skilled arbitrators with a professional association of their own; (2) company and union representatives who know the process; and (3) a private nonprofit administrative organization to help select arbitrators and provide facilities for hearings. This organization, the American Arbitration Assn., also helps develop ways to make arbitrations even more effective.

The Mechanics

The process is not automatic. The arbitrator is still the key to a sound award. And his job, despite the safeguards, requires far more judgment than merely the ability to measure the facts of the dispute against the yardstick of the contract.

Take for example the most frequent type of dispute submitted to arbitration: discharge or suspension of an employee. The contract will usually say that the company has the right to discharge or discipline for "just cause." But what is "just cause"? In general, it is an infraction that companies and unions have come through experience to regard as serious enough to warrant disciplinary action. But that isn't giving very much more specification to this normal contract clause. And, whether the insubordination, the tardiness or the poor work are sufficient varies with the circumstances as well as the industry.

A man who uses rough language with his supervisor at the blast furnace may be completely inoffensive. Even milder words in the front office may be highly insubordinate.

Discharge cases are particularly sensitive because the stakes are high. These days, when seniority and pensions are important property values, discharge is a most serious penalty for the individual. But if an employee is reinstated after being charged with an offense the employer believes warrants discharge, the entire system of discipline in the plant may be impaired.

What Is Arbitration

▪ When bargaining has been exhausted, when negotiations are dead-locked, when mediation fails, arbitration is ready to step in. It should not be confused with mediation; it is the last step before the strike or the lockout. You'll find arbitration in more than 90 pct of the 90,000 collective bargaining agreements in the United States.

I have in mind a case where I decided to suspend two older employees for six months (a $3000 loss in earnings) but to reinstate them at the end of that time to protect their pension rights. I said in my decision that the next employee guilty on the same score would be dismissed. This protected the company's disciplinary system and the offense was never repeated.

How Much Power?

Should an arbitartor have the power to reduce the penalty of discharge to suspension? Or should he be restricted merely to the question of whether or not the employee committed the offense?

I feel that the arbitrator should have this power. Others disagree. I think exercising his discretion

within this range enables him to use his skilled knowledge of industrial relations to bring in a balanced award.

Other types of cases do not permit even this limited use of discretion. In one of my recent cases I was faced with a dispute over reinstatement of employees laid off because of a shortage of work. In what order should they return and to what departments? In reviewing the contract I felt it required a method of reinstatement that would create serious problems of administration for both sides. I wrote the parties, suggesting they make one final effort to get together before I issued my award. I was careful to give no clue to how I would decide the case so as not to prejudice their talks. They were not able to agree, so I made my award following precisely the language of the contract as I understood it. I had no alternative under the mandate I had been given.

Don't Mediate

While the result in this case was unsatisfactory, it was more important to sustain the force of the contract than to achieve what I might have thought was a better result. I had used the only alternative open to me in suggesting that the parties try to settle the dispute themselves through negotiation.

But I did not propose to **mediate** the dispute, and I never do unless I am asked to by the parties. After all, they have retained me to **arbitrate**, i.e., to dispose of their dispute by making a final and binding decision, and not to try to induce them to compromise their contentions. Proper enforcement of this rule is another reason the arbitration of grievances has gained wide acceptance.

In earlier days there was an opposite tendency, sometimes because of the arbitrator's reluctance to make a hard decision. But a seasoned arbitrator knows what is required even though he displeases one side or the other.

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BUSINESS

MERGER: The Battle Is On

Proposed Bethlehem-Youngstown merger would alter competitive pattern in steel . . . But courts will decide whether it's for better or worse—By *J. B. Delaney.*

◆ THERE'S NO DOUBT that if the merger of Bethlehem Steel Co. and Youngstown Sheet & Tube Co. goes through, the competitive situation in steel will change.

The big question in the minds of steel people is whether the change will lessen competition, as the Justice Dept. contends, or whether it will sharpen rivalry between the merged company and the biggest of them all—U. S. Steel Corp.

If the proposed merger weathers a court battle with the Anti-trust Div., already underway, other steel producers are speculating on whether it will start a rash of other mergers and really scramble the competitive pattern of the industry.

Most mills find it hard to work up a sweat over the Bethlehem-Youngstown development until the die is cast one way or another. Some are even comforting themselves with the thought that bigness does not necessarily spell efficiency.

Steel companies seem ready to accept the proposed amalgamation for what it is: a move by Bethlehem Steel to establish itself in the lush Midwest steel market. At the same time the realists are not kidding themselves about one thing: the combined top-management talent of Bethlehem and Youngstown would be hard to beat.

Lessen Or Increase

Meanwhile, it will be many months before the courts decide whether the merger would "substantially lessen" competition in steel, as the Justice Dept. believes, or whether it would bring about a "substantial increase" in competition, at least in the Midwest, as Bethlehem and Youngstown are arguing.

Bethlehem-Youngstown Versus Justice Department

THE COMPANIES	THE GOVERNMENT
The merger would increase, not lessen competition; particularly in the Midwest.	**Merger may substantially lessen competition, or tend to create a monopoly.**
Relatively little competition now exists between Bethlehem and Youngstown.	**Competition between Bethlehem and Youngstown would be eliminated or substantially lessened.**
Overemphasis placed on Bethlehem's comparative national size. Steel is not a national market, but local markets served by plants in different sections of country.	**Concentration of equipment for production and sale of iron, steel, and oil well drilling and production machinery in hands of largest producers would be increased.**
Merger would effect economic savings by eliminating cross-hauling and duplication of equipment.	**Merger would heighten Bethlehem's competitive advantage over smaller companies.**

Plant & Main Products. Ingot Cap. in Millions of Tons

BETHLEHEM

1.	**Johnstown** Plates, Bars, Rods, Wire	2.3
2.	**Bethlehem** Structural Shapes, Bars	3.5
3.	**Sparrows Point** Plates, Sheets, Rods, Tinplate, Wire, Pipe & Tubing	6.2
4.	**Steelton** Rails, Tie Plates	1.5
5.	**Los Angeles** Structural Shapes, Bars, Wire	0.5
6.	**San Francisco** Structural Shapes, Bars	0.3
7.	**Seattle** Structural Shapes, Plates, Bars	0.3
8.	**Lackawanna** Structural Shapes, Plates, Sheets, Bars	5.5

YOUNGSTOWN

9.	**E. Chicago, Ind.** Sheets, Tinplate, Pipe, Bars	2.7
10.	**Brier Hill** Pipe & Tubing	1.2
11.	**Campbell** Sheets, Bars, Rods, Pipe & Tubing	1.8

The proposed merger of Bethlehem and Youngstown Sheet & Tube is heading for a court battle with the Justice Dept. While products made by the two companies overlap in some instances, competition geographically has been slight.

The two companies now have a combined capacity of approximately 26 million ingot tons, with Bethlehem accounting for 20 million. This compares with approximately 39 million tons for U. S. Steel. Net sales in '55 were: Bethlehem $2.1 billion; Youngstown $626 million. U. S. steel sales in the same period were $4 billion.

If the merger is approved, one of the first moves by the new company would be to add three million tons of new capacity at the Youngstown and Chicago plants of Youngstown Sheet & Tube. Bethlehem is underway on a $400 million two-year expansion program, including three million tons of additional ingot capacity.

A rundown of the principal finished steel products made by the two companies shows an overlapping in some items, but due to the geographical location of their plants, actual competition is slight. In one principal product—oil country goods—Bethlehem is not now involved. Bethlehem is a major producer of plates and structurals, but Youngstown is not a factor in these markets.

In the Midwestern market, Bethlehem and Youngstown in 1953 jointly accounted for 12.9 pct of "common" finished steel product shipments into Ohio; 12.3 pct in Michigan; 8.2 pct in Texas, and 6.9 pct in 24 other mid-continent states. This is based on the testimony of Arthur B. Homer, Bethlehem president, before the Senate subcommittee on antitrust and monopoly in 1955.

In other directions, the two companies have widespread interests in the raw materials of steelmaking, such as iron ore, coal, and limestone. Both are in the business of fabricating steel. Youngstown makes stampings and pressed steel products. Bethlehem is a large fabricator of structural steel, and operates shipbuilding and ship repair yards.

The proposed merger has been

brewing since 1954 when Bethlehem announced it was seeking a Dept. of Justice ruling on whether the marriage would violate the antitrust laws. The Government indicated it frowned on the idea and the companies held their own counsel until last week. At that time they entered into an agreement calling for the acquisition by Bethlehem of Youngstown in exchange for common stock of Bethlehem.

The Background

Within 24 hours, the Government went into U. S. District Court and asked that the merger be postponed pending disposition of the case by the courts.

Bethlehem and Youngstown have wanted to merge as early as 1930. But at that time, private interests fought the proposal. The courts finally okayed it, but meanwhile the depression set in and the plan was dropped.

In his testimony before the Senate antitrust committee, Mr. Homer answered two questions most frequently asked concerning the proposal: (1) why doesn't Youngstown expand in the Midwest, and (2) why doesn't Bethlehem build itself a plant there?

The Problem

"The answer to both questions is found in the cost of steel facilities," said Mr. Homer.

"In these days of high costs, a ton of steel capacity in a new integrated steel plant costs $250 or more, not counting the cost of properties which would supply the raw materials for that plant.

"That figure is to be compared with the average cost of about $70 a ton, as shown by the industry's books, for the installed capacity as of today.

"The figure of $70 a ton reflects the fact that much of the present capacity was installed before prices attained their present level. It also reflects the fact that an important part of recent increases in capacity has been effected by the instalment of improved equipment as existing furnaces are rebuilt. This is much the most economical way of increasing capacity.

". . . To provide three million tons of additional capacity at a new integrated plant would cost in the neighborhood of $750 million. It is estimated that to increase the capacities of the existing Youngstown plants by a like tonnage would cost $350 million."

Other Arguments

Mr. Homer also made these other points:

1. For Bethlehem to build a new integrated plant would put it at a competitive disadvantage with other companies already in the Midwest.
2. Youngstown alone does not have the resources to finance three million tons of additional capacity.
3. The merger would effect economies by eliminating cross-hauling and duplication of equipment.
4. National defense would benefit through the availability of Bethlehem's experience in the production of heavy steel products, such as structurals, plates, forgings, and ordnance.
5. There would be no danger of monopoly because the combined companies would not be in anything like a dominant position, either nationwide or in the mid-continent area.

Engineers:

Twelve pct are now union members.

Engineering unions now claim as members nearly 60,000 of the nation's 500,000 engineers, according to a study just completed by the National Industrial Conference Board.

Going after the reasons why, NILB found that engineers are not completely happy with their financial position, their status as professionals, and their treatment as "individuals." And one answer to this discontent is apparently unionism.

The Narrow Gap

One of the chief financial complaints of engineers, the study reveals, is that the earnings differential between salaried engineers and wage earners has become too narrow in many companies. In addition, in terms of fringe benefits engineers say their former advantage over the production worker has been virtually wiped out.

Union leaders say engineers have unionized to regain the professional status they felt was lost with mass employment. As professionals engineers want: (1) better communication with management in order to clarify their understanding of company policies; (2) credit in reports and papers they help develop; (3) classification as professionals rather than grouping with nonprofessionals; and (4) less frequent assignments to jobs requiring little engineering ability.

Another Way?

While engineering unions believe unionization the answer to engineer discontent, the engineering societies disagree. The National Society of Professional Engineers has published a checklist covering such areas as engineer recruitment; indoctrination; technical, administrative, professional and personality development of the individual; and company practices. Also included are recommendations of the Engineers Joint Council for raising professional standards and improving employment conditions for engineers.

Engineers who have gone union have joined one of three types. These are: (1) independent, professional unions, such as the Engineers and Scientists of America; (2) semi-professional unions, such as the American Federation of Technical Engineers, AFL-CIO; and (3) production workers' unions, such as the UAW, USW, and the International Union of Electrical Workers, all AFL-CIO.

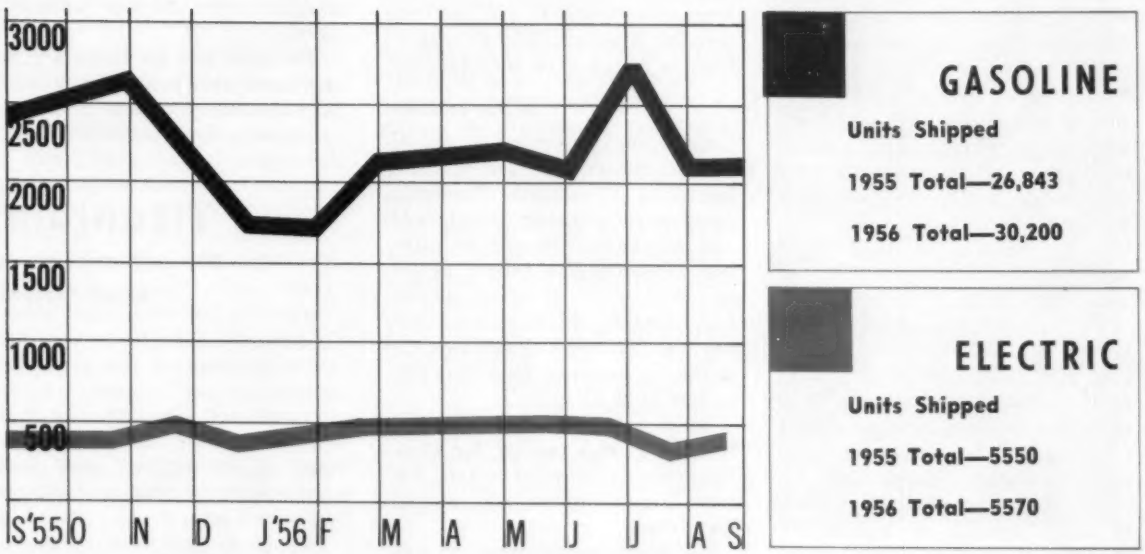
Meet the Market

American Coils Co., manufacturers of packaged air conditioners, is moving plant and executive offices from Newark, N. J. to a new building now under construction in Farmingdale, N. J.

Reason for the move is expansion to meet growing market for heat pumps and packaged air conditioners in residential and commercial use.

INDUSTRIAL TRUCKS: Price Vs. Upkeep

Gas driven vehicles are enjoying a 5 to 1 sales ratio but users are finding that electric have long range maintenance economy . . . Both show substantial increases . . . Auto producers study costs—By *T. M. Rohan.*



Gasoline Vs. Electric Powered Industrial Trucks

Source: The Industrial Truck Assn.

◆ GAS POWERED trucks are far and away the top seller in the industrial truck field, but battery-powered trucks are more than holding their own.

Four or five times more gas than electric trucks will be sold this year. Last year it was 27,000 to 5700. But a significant trend toward higher priced electric units by blue chip, big fleet users is developing. The reason: lower maintenance costs.

Oldsmobile Div. in the last few years has bought almost 400 electric units after a thorough, long term cost study. This started a trend at Fisher Body. Sixty electrics were included early this year in plant expansions and equipment replacements.

Relative Merits

Ford Motor has also bought about 150 electric trucks after finding a 4 to 1 ratio on maintenance costs. Pan American Airways installed a fleet of electrics in its new quarters at San Francisco international airport. Previously they were used inside only but are now also used as baggage trucks. Railroads have always been heavy users. So have steel mills and other processing industries where dependability is paramount.

Discussing the relative merits of the two is like deciding whether the army or the navy won the war. Tremendous industrial growth in the last few years has so expanded the industry that both types are on a steady increase.

Most old-line electric truck makers now turn out both types although promotion of gas types is easily double that of electrics. Yale & Towne, Clark Equipment and Baker Raulang are examples. Elwell-Parker and Louis Sheppard stick to the electrics. And a host of companies turn out gas powered types only.

The electric truck's big forte is still long life, low operating costs and simplicity while its drawback is high initial cost. Its proponents believe the larger blue chip companies are more willing to make a major initial investment and get their money back over a long operating period. A gas truck buyer, conversely, can get two gas trucks for the price of a single electric and have repairs and repair parts charged off separately as maintenance items.

Battery efficiency for the electrics has brought operating costs to about 32-40 cents per day and batteries can now be changed in a few minutes. Operating speeds are still limited to about 6 mph which lessens their advantage on continued hauls over 150 ft. and on ramps.

EXPANSION

SCRAP: New Hope For Titanium

Process developed By Mallory-Sharon may be the answer to titanium scrap bottleneck . . . Lab tests successful, pilot plant next step . . . Scrap quality unimportant.

◆ THE PROBLEM of processing titanium scrap may soon be solved.

Mallory-Sharon Titanium Corp., Niles, O., announces a new electrolytic process which yields extremely pure titanium from almost any grade scrap. Several hundred pounds of the metal have been recovered in laboratory tests and the company is going ahead with plans to build a pilot plant to completely evaluate the process.

The basic refining method, known as the Dean-Raney Process, was developed by Dr. R. S. Dean and Dr. Ben B. Raney. Laboratory work was handled at the Chicago Development Corp., sponsored by Mallory-Sharon.

The end product of the process is large crystals of high-purity titanium, formed on a steel cathode in a heated electrolytic solution. The crystals have a Brinell hardness of 60, the company said, compared to 120 to 140 for commercial titanium. Elongations as high as 60 pct have been reached.

A Big Problem

Since the beginning of the titanium industry, re-use of scrap has been a problem. Presently, scrap must be segregated, cleaned, and processed. Oxygen or nitrogen contamination cannot be tolerated because of strict quality requirements. Although producers are melting some titanium scrap in their operations, technical difficulties limit its use.

As a result, there has never been as good a market for titanium scrap as for other metals. The Dean-Raney Process may change the picture.

Mallory-Sharon expects its new plant to be completed by June, 1957. The firm is engaged in a major expansion program aimed at increasing its titanium melting capacity to 1 million pounds a month by early 1957.

"There is a great deal of evaluation and study to be done when the pilot plant is in operation," explains James Roemer, Mallory-Sharon president. "Nevertheless, we have enough confidence in the process to invest several hundred thousand dollars in this facility, and we feel it will lead the way to economical scrap recovery and a much stronger titanium industry," he adds.

Titanium and its alloys are being used predominantly in military aircraft programs. New uses in industry are continually being developed.

No Tinsel Needed For This Metallic 'Xmas Tree'

◆ IT MAY LOOK like a Christmas tree but the object at the right actually is a steel cathode with titanium crystals clinging to it. The titanium was recovered from scrap by a new electrolytic process.

The process may prove a delayed Christmas present for titanium scrap generators and refiners who are stuck with large quantities of the stuff due to high cost of present refining methods.

Mallory-Sharon Titanium Corp., developer, of the new process, isn't revealing all the details yet. Laboratory tests were successful and the next step is a pilot plant. By Dec. 25, 1957, the titanium scrap market may hit full stride.

Mallary-Sharon expects its pilot plant to be completed in June, 1957, time enough to prove itself.

Titanium:

New $40 million company being formed.

Kennecott Copper Co. and Allied Chemical & Dye Corp. are planning a new company to produce and sell titanium. The joint venture calls for an initial investment of $40 million, with both corporations owning equal shares in the new firm.

Site of the proposed plant has not been revealed, but it is expected production of titanium tetrachloride, sponge and billets will start late in 1958.

Combine Resources

The joint venture will enable the parent companies to combine technological resources in metal fabricating and chemical processing, according to Charles R. Cox, president of Kennecott, and Fred J. Emmerich, Allied Chemical president.

Major contributions of Allied Chemical will be its new continuous process for reducing titanium tetrachloride to sponge by use of sodium, and a process for making titanium tetrachloride from titanium slag.

Kennecott's subsidiary, Chase Brass & Copper Co., Inc., has developed methods for melting and fabricating titanium which will be used in the new operation.

The new corporation will be separate from Quebec Iron and Titanium Corp., which is partly owned by Kennecott.

EXTRUSIONS: Steady Push from Aluminum

Production of aluminum extrusions levels off . . . But continued growth pattern is assured . . . Rigid and collapsible extrusions will each take about 7 million lb of aluminum—By G. J. McManus.

◆ SALES OF ALUMINUM impact extrusions have leveled off this year after a dizzy postwar climb.

Both rigid wall and collapsible tube extrusions are pausing a bit, but neither shows signs of departing from longterm growth patterns. Rigid-wall impact extrusions will take about 7 million pounds of aluminum this year. This is slightly under the 1955 bite. It is nearly four times greater than the 1946 poundage.

Toothpaste, shaving cream and other collapsible tubes will take around 7 million pounds of all metals this year. More than half of this will be in the form of aluminum extrusions. Over the past 10 years, collapsible tube production has risen five times. Over a slightly longer period, the aluminum share of the market has risen from 10 pct to the current 50 pct plus.

Cost Advantage

Key factor in these gains has been the cost advantage of impact extrusion. The way the process works, an aluminum slug is held in a die and struck with a formed punch. The metal flows up through the opening between the punch and the die. In this manner, a single stroke forms a piece that can be ribbed, splined or fluted along its length; forged into intricate shapes at its closed end.

For rigid wall extrusions, the reduction in tooling cost, forming operations and machine work has meant savings up to 80 pct over previous methods of turning out a piece. This economy, plus close-tolerance work (.005-.015 in.), uninterrupted surfaces and other features have brought aluminum impacts into a wide range of fields.

Originally, the impacts were used mostly for ordnance shells and limited number of other defense applications. Commercial applications grew at a respectable rate during the immediate postwar period, averaging under 1 million lb increase a year and moving unevenly. Then in 1953 production jumped by 2.4 million lb.

Stepped up sales activity and growing design versatility brought aluminum impact extrusions into the volume markets. About two years ago, automotive producers began adopting extrusions wholesale. Transmission shafts, oil filter cases, brake pistons and spark plug covers are among the auto applications that are said to account for over 20 million extrusions a year.

Other than Auto

Outside the automotive field, aluminum impact extrusions are used in fire extinguisher shells, flashlight cases, thermos jugs, dictating machines and many others. Materials range from commercially pure aluminum to high-strength alloy.

At its Edgewater, N. J., plant, Alcoa has run aircraft jobs with as few as 500 pieces but a normal, commercial quantity would be around 200,000. Alcoa impact extrusion presses are in the 1000 ton range.

In the collapsible tube field, biggest aluminum uses are in dentifrices, which account for about half of all tubes; and in shaving cream, which is a little under twenty percent. Threats to the flexible aluminum tubes include fluoride toothpaste, which is going into non-aluminum tubes, and foam type shaving cream, which gets away from tubes altogether.

Despite these inroads, aluminum's share of the tube market is holding at more than 50 pct. Lead accounts for something over 30 pct and tin about 10 pct of the market. Aluminum men are hopeful that some type of interior coating will take care of the fluoride problem. They feel that cost advantages and decorative possibilities assure aluminum a dominant position in the tube picture. Possibilities include food, drugs, and just about any semi-liquid.

Yearly Production of Aluminum Impact Extrusions

YEAR	PRODUCTION
1946	1,800,000 pounds
1947	1,700,000 pounds
1948	2,700,000 pounds
1949	2,300,000 pounds
1950	3,200,000 pounds
1951	3,500,000 pounds
1952	3,900,000 pounds
1953	6,300,000 pounds*
1954	7,300,000 pounds
1955	8,500,000 pounds
1956*	6,600,000 pounds

* Iron Age Estimate

FURNACES: Fewer Standards, More Sales

Trend toward custom-built industrial heating equipment means a record year for furnace makers . . . Appearance of natural gas in plentiful supply is changing designs . . . Automation reduces labor costs.

◆ DEMAND for custom-built, automatic furnaces in metalworking plants has led the way to a record $180 million year for the nation's industrial heating equipment industry.

More customers are asking for ovens and furnaces that will do in one operation what several used to do. Standard furnaces are accounting for a smaller percentage of sales. And fuel economy is taking a back seat to process needs.

Furnace makers are faring well because of the tremendous surge in capital spending begun in 1955 by most industries. Record shipments in 1956 compare to $158.4 million in 1954 and $75.4 million in 1947. Order backlogs amounting to over $80 million assure furnace makers of many busy months to come.

Filter Heating

The swing toward custom-built furnaces has had some effect on increasing employment in the industry. In 1954 there were 8,300 workers compared to 6,400 in 1947. Adding to the employment total is a 54 pct increase in the number of companies during that period. There are 166 now. In 1947, there were 108.

Biggest forward steps in furnace design are toward faster heating, both for heat treating and hot-working. Metalworking companies are learning that metals can safely absorb heat at extremely high rates, so long as the heat is applied uniformly.

The one thing that has had the most influence on furnace design in the past 10 years is natural gas. A decade ago, natural gas was not available in most localities. Electricity was often the cheapest source of heat.

Fuel Change

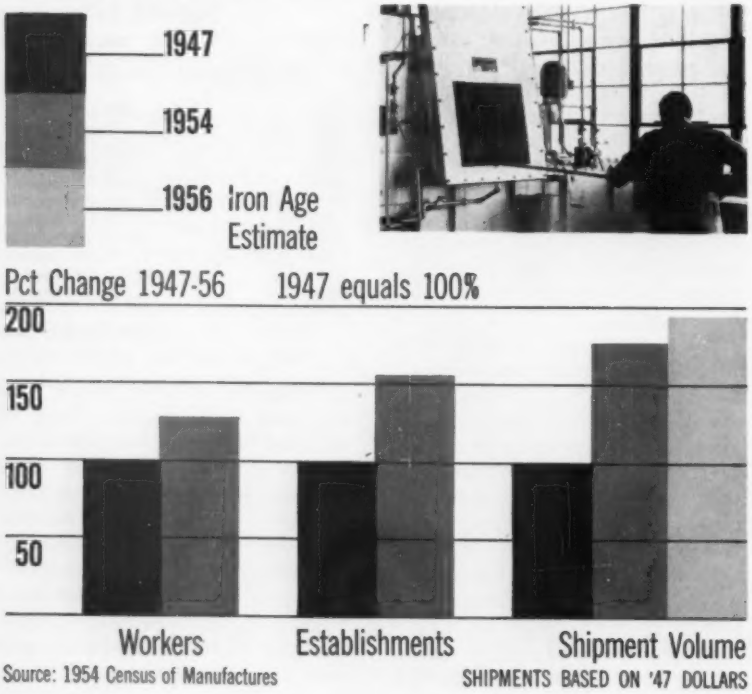
But since conversion of the Big-Little Inch pipelines to gas transmission after World War II, the fuel picture has changed. Gas offers more advantages for industrial purpose: ease of transportation and control, high heating value, and economy. Furnace builders are making the best of these advantages when designing new equipment. Now, gas and solid fuel furnaces account for about 80 pct of all industrial sales. Induction di-electric accounts for about 20 pct.

Faster, more uniform heating by convection—often with radiant gas units—is a major development in the last 10 years. Controlled atmospheres for scale elimination and carbon control in surface hardening are another.

New refractories reduce heat loss and permit easier maintenance. New core baking ovens offer cleaner working conditions, faster and more uniform drying at less cost.

And automatic devices for handling fuel, stock and furnace repair, are doing much to reduce labor costs. Conveyors, charging devices, removable roofs, are just a few of these devices.

Hot Market For Furnaces



Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Users of tubing for cylinder applications now you can have this new...

J&L Cold Drawn ELECTRICWELD

Tubing with a Special Smooth ID Finish

Reduces your overall production costs in applications like these . . .

- **cylinder tubing**
- **hydraulic and pressure tubing**
- **shock absorbers**
- **ordnance components**

This new drawn-over-mandrel grade tubing with its mirror-like inside surface finish is today busy helping manufacturers reduce or entirely eliminate costly machining on many applications and is being substituted for more costly types of steel tubing. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

J&L Cold Drawn ELECTRICWELD Tubing with a *Special Smooth* ID finish combines the physical advantages imparted by today's modern electric welding techniques with those of cold working. It withstands high internal hydrostatic pressures, carries heavy torsion loads, resists high-frequency vibration, and offers a favorable weight-to-strength ratio for applications in which loading occurs in all directions.

J&L Cold Drawn ELECTRICWELD Tubing can be furnished in its three specifications in OD sizes from ½ inch to 2⅝ inches and in wall thickness from 20 to 10 gage, 0.035 and 0.134 inch respectively.

This new booklet provides the information you need . . . specifications . . . tolerances . . . chemistry . . . mechanical properties . . . annealing . . . finishes.

Send for your free copy today!

J&L STEEL

Jones & Laughlin Steel Corporation
Dept. 403, 3 Gateway Center, Pittsburgh 30, Pa.

Send me a copy of your new Cold Drawn ELECTRICWELD Booklet.

Name_____

Title_____

Company_____

City_____ Zone____ State_____

EXPANSION IN INDUSTRY

Tax-Am:

Steel bids now over $2 billion.

Latest application, by Sharon Steel Co., pushes steel industry tax amortization bids to over $2.1 billion. Total of 23 firms are involved.

Sharon is seeking tax benefits of $14 million worth of a $22 million project. New facilities will produce carbon, alloy and stainless steel slabs and blooms. Principal items will be two electric furnaces, to be located at Farrell, Pa.

No steel goals are now open. Office of Defense Mobilization is reviewing the need for additional steel capacity in case of another emergency. Being scanned particularly are further tax amortization for heavy plate, structurals, and oil country goods. Steel firms began putting their applications "on the record" last July in case the expansion goals are reopened.

Industry spokesmen have told the government they aren't bluffing in seeking amortization. A spokesman for one of the major producers says that his firm won't build more than a "token" part of the multimillion-dollar expansion it is considering unless the goals are reopened.

Ferro Alloy Plant

Ohio Ferro-Alloys Corp. is planning a new $3 million plant near Clarington, O., for producing silicon alloys for the aluminum, steel and chemical industries.

Three electric furnaces will be installed initially, and the plant will have enough space to allow for tripling its production in the future. The plant site is close to steel producing centers of the upper Ohio River and will be equipped with a dock for barge shipments.

It will provide employment for 150.

Alumina from Guiana

Aluminium Ltd., of Canada, world's second largest aluminum producer will spend $33 million for the production of alumina.

The new plant will be located near Mackenzie, British Guiana. Construction will proceed in conjunction with the new smelter construction in Canada. It is expected to be completed in about 30 months.

Capacity will be about 250,000 tons of alumina annually.

Armco Drainage Builds

Armco Drainage & Metal Products, Inc., is building a 30,000 sq ft fabricating plant at Springfield, Ill. The new plant will be four times larger than the company's present Springfield operation.

Located on an eight-acre site, it is scheduled to go into production in March, 1957, and will supply galvanized corrugated pipe and pipe arches, paved and coated pipe in the Illinois-Indiana-Missouri area.

More Tantalum

Fansteel Metallurgical Corp. has appointed Dickmann-Pickens-Bond Construction Co., Muskogee, Okla., general contractor to build the $6.5 million Fansteel plant on a 113-acre site near Muskogee.

The plant, owned and operated by Tantalum Defense Corp., a wholly-owned Fansteel subsidiary, will produce tantalum and columbium metal powder and ingots.

Piasecki Expands

A 330-acre plant, machinery, and other physical assets formerly owned by the Aircraft Div. of Bellanca Corp. at New Castle, Del., have been acquired by Piasecki Aircraft Corp.

Will Seek New Fuels

Sylvania Electric Products Inc., has taken an option on 150 acres in Andover, Mass. Site is for the proposed new atomic center for research, development and production in field of atomic energy.

Project is being held up pending formation of Sylvania-Corning Nuclear Corp., jointly owned by Sylvania and Corning Glass Works.

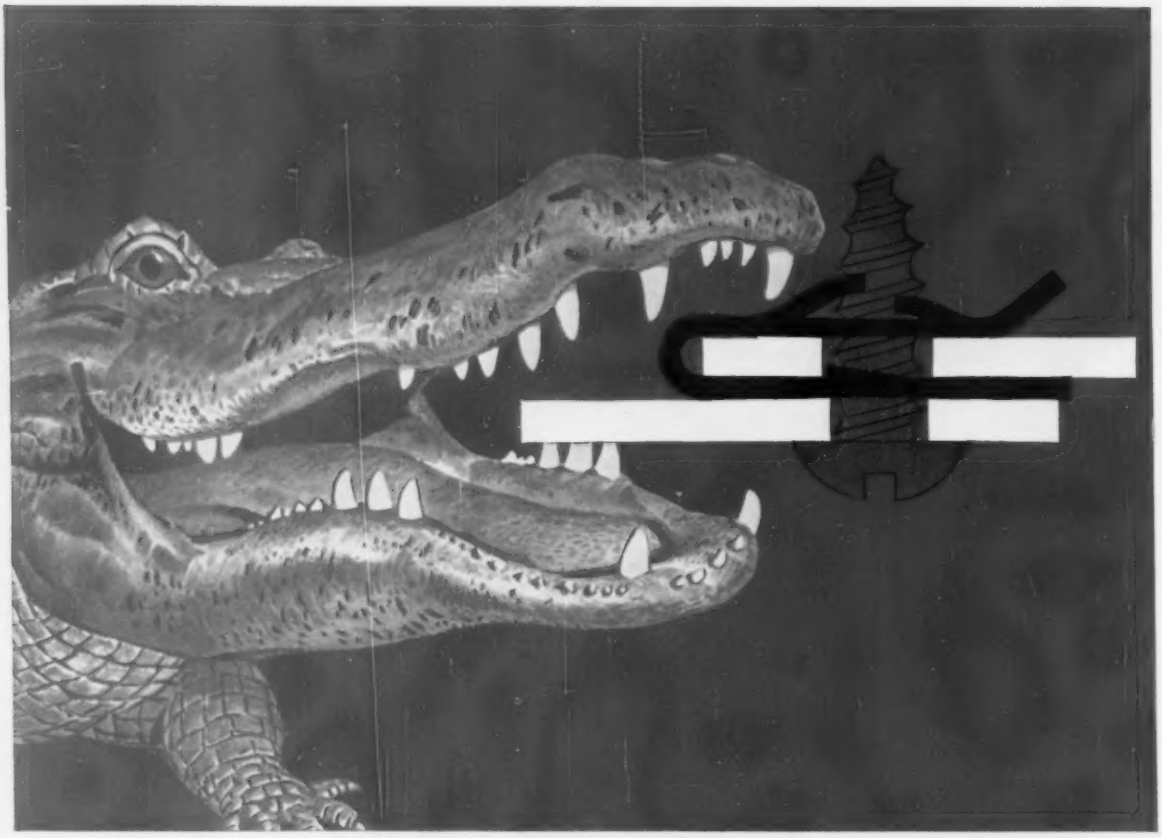
Work in the new facilities will be concentrated on nuclear fuel elements and components.

Total of five buildings are planned, with 150,000 sq ft of floor space. Operations are expected to begin early in 1958.

Working on the World's Biggest

◆ NEW BLAST furnace nearing completion at Bethlehem Steel Co.'s Sparrows Point, Md. plant is a vital part of the two year expansion project designed to make the installation the world's largest steel plant. Program scheduled for completion in mid-1958, will boost the annual ingot capacity at Sparrows Point to about 8.2 million tons.

Total company expansion currently authorized will cost close to $400 million. It is aimed at boosting Bethlehem's steelmaking capacity by 3 million tons.



STEEL JAWS THAT NEVER RELAX

fasten a fastener in place

Alligator jaws have nothing on Tinnerman "U" and "J" type fasteners in gripping power. These fasteners press easily into locked-on position over panel edge or center panel locations. Yet they provide positive self-retention, ending the need for welding, staking or other secondary fastening devices. They are ideally suited for blind assembly or hard-to-reach locations.

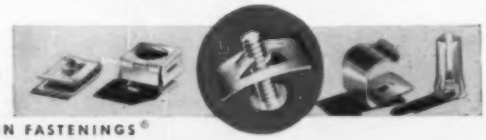
When combined with the familiar Tinnerman SPEED NUT, this unique fastening principle provides a one-piece, self-locking, self-retaining fastener that is fast and easy to apply. The "U" or "J" feature can be combined with wire and tube retainers, latches, catches and a host of other fastening requirements to save time, material and production costs.

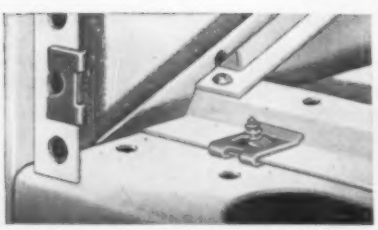
Find out about these and more than 8,000 other types of SPEED NUT brand fasteners now serving industry all around the world. They can make important savings for you, can also simplify your assemblies. See your Tinnerman representative soon or write to us. **Tinnerman Products, Inc., Box 6688, Dept. 12, Cleveland 1, Ohio.**

TINNERMAN

Speed Nuts®

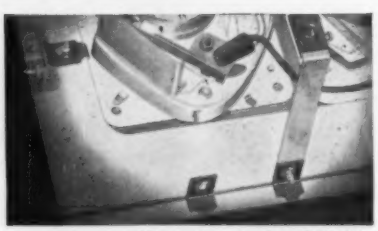
FASTEST THING IN FASTENINGS®





Greater flexibility for control equipment enclosures is provided by self-retaining "J" type SPEED NUTS at 30% less production cost.

Assembly costs on this sheet-metal skylight frame are reduced 66% by Tinnerman "U" type SPEED NUTS.



Gas range assembly costs are reduced 25% to 50% by using Tinnerman "U" and "J" type SPEED NUTS.

REPORT TO MANAGEMENT

Don't Get Caught Off Base

There's a slight danger of being misled by the big round of optimistic predictions you will be seeing for 1957. This is the time of the year when executives and economists will look into the future—12 months of it, that is—and make their predictions for 1957.

The general tone will be one of extreme optimism. There is no quarrel with that. When the totals are added up, gross national product and other major economic indicators figured, there's not much doubt that 1957 will be one of the best business years in history.

But that won't tell the whole story. Not all business will prosper equally. There is no guarantee for those in the wrong markets; no built-in insurances for those who guess wrong on trends.

You may have noticed, for example, that a major appliance maker laid off workers recently in two plants. The layoffs were attributed directly to slow business in items that are directly tied in with new home building, which everyone knows has fallen off.

You shouldn't have to be reminded, then, that even the best products aren't going to move if the market isn't keeping pace.

Beware of the Danger Points

This doesn't mean that you should neglect the home building market. Far from it. But don't ignore the trends. Don't bet heavily on the small home in times of tight credit. But, at the same time, you might look into the growing number of larger houses.

The farm market just isn't what it used to be. And, barring something unforeseen (like our being forced again to feed large portions of the world) it will be characterized by a smaller number of farms; but larger ones. This means fewer small farm implements, but more of those which provide greater productivity for less manpower.

European markets may also drop off to a significant extent. The Mid-East crisis and closing of the Suez may now take off the edge, if not actually undermine, the European business boom.

The mere fact that gasoline is rationed in England had the effect of cutting off almost one-fifth of Britain's auto industry labor force within a few days. It will get worse before it gets better.

England's current financial plight has placed even more emphasis on export, with curtailment of import, to restore as far as possible a favorable balance of trade. Dollar reserves have to go for Western oil, with the country now faced with the difficult prospect of recovering them from exports.

Perhaps it should be repeated that this is not a prediction of doom and gloom. But there is no point in rushing headlong into a danger area without being alert to its possibilities.

Watch That Christmas Gift

You can't be too careful about how you handle the problem of seasonal business gifts.

While the habit of giving business presents will probably never be entirely eliminated, many top corporations have tough rules that they insist will be followed.

Even Harlow H. Curtice was prompted to send out a policy statement to GM suppliers on the subject. He had already made his feelings known to GM employees.

He quotes a U. S. senator like this: "We have a rule here, if you can eat it up, smoke it up, or drink it up in one day, it's all right." He implied what's good for the U. S. Senate, in this case, is good for GM.

INDUSTRIAL BRIEFS

Big Blow Out . . . Norton Co., Huntsville, Ala., has dedicated a new electric furnace plant at a two-day open house program. The plant will manufacture a variety of electric furnace materials including boron carbide, fused zirconia, fused magnesium oxide, and fused alumina.

Let It Be Light . . . The Aluminum Supply Co. is opening a branch factory to produce aluminum irrigation tubing in Grand Island, Neb. The plant will be in operation on or before February 1, 1957. A new building is being constructed to house the initial tubing mills now being produced in the Aluminum Supply Co. plant in Spokane, Wash.

Moving into a Vacuum . . . A new division has been formed by Industrial Solvents & Chemicals, Inc., Wilkinsonville, Mass., called Vacuum Coatings, Inc. It will handle and formulate finishes for vacuum metallizers. The company will supply technical information and materials for vacuum metallizing.

Resistance Is Strong . . . A half-million dollar addition to Taylor-Winfield Corp., Warren, O., resistance welder manufacturers, will be completed January 1, 1957. Cost includes $204,000 for buildings and $340,000 for new manufacturing equipment. Total amount spent by Taylor-Winfield on plant expansion in the past 11 years is $1.5 million.

Deserves It . . . Joseph S. Thompson, president, Federal Pacific Electric Co., received a watch on occasion of the 50th anniversary of the company. He built the first high voltage switches produced by the Pacific Electric Mfg. Co., a predecessor company, in 1906.

Up and Out . . . The Landis Machine Co., manufacturers of threading machinery, has moved its Detroit office to 12806 Fenkell Ave., Detroit.

Homework . . . The Metals Engineering Institute, Div. of American Society For Metals has initiated four home study courses aimed at the critical shortage of technical manpower. It is intended for both individual and in-plant training. Detailed information is being readied for January release available from the ASM Metals Engineering Institute, 7301 Euclid Ave., Cleveland.

King Size Erector Set . . . Steel shelving, called Erectomatic, will be introduced by Standard Pressed Steel Co. at the Plant Maintenance and Engineering Show in Cleveland, January 28-31, 1957. SPS will also show a new steel storage cabinet to hold shop tools, and all-steel peg boards for open wall-storage.

Pick A Peck Of Patents . . . A system of awards to employees for all patent applications filed in their names has been initiated by Blaw-Knox Co., Pittsburgh. First award of $100 was made to George Anaston, engineer, in the Tower Section of company's Equipment Div. at Blawnox, Pa.

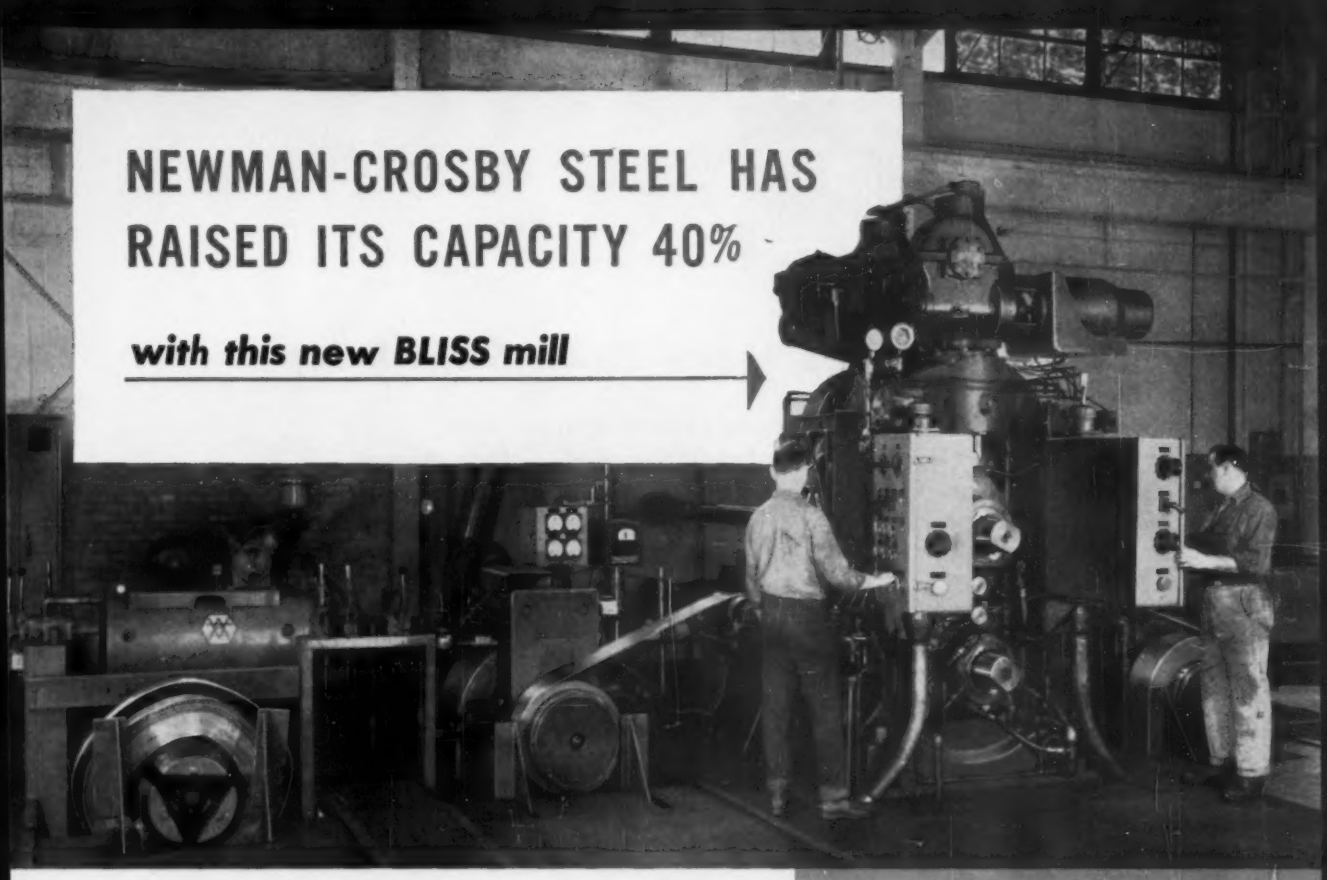
Cash for Stampings . . . Stamping designers are eligible for the Pressed Metal Institute's "John Woodman Higgins Redesign Award." No formal paper or entry form is required. Three criteria are: successful stamping production of a part previously manufactured by another process; originality of the design; significant production cost savings. Entries to Pressed Metal Institute, 3673 Lee Rd., Cleveland 20, O. Prize is $500.

Probing the Pentagon . . . The Reinforced Plastics Div. of the Society of the Plastics Industry, Inc., now has a newly formed committee. Its objective: faster and more accurate development of military specifications calling for reinforced plastics.

Ore Else . . . Ore carriers of Pittsburgh Steamship Div. broke a 57-year fleet record for the latest Great Lakes shipping season in history. The previous record was set on December 17, 1899. The steamer Malietoa took on the last cargo of ore for the season at Two Harbors, Minn.

NEWMAN-CROSBY STEEL HAS RAISED ITS CAPACITY 40%

with this new BLISS mill



Like many another metal producer, Newman-Crosby Steel Company is betting confidently on the continued healthy growth of the American economy! This Rhode Island producer of close-gage cold rolled strip has just raised its capacity a good 40% by installing a new Bliss 4-high reversing mill, as well as new coil-handling and heat-treating facilities.

The 6½" and 16" x 14" mill is used to roll high-carbon and alloy spring steel in gages between 0.125" and 0.010", in widths up to 12" and at speeds to 800 fpm. In actual operation all these design specifications have been exceeded. Bliss also designed and built the coil-handling facilities, including the two tension reels and coil buggies and the pay-off reel. Maximum limit on coil weight is 6,000 pounds.

An unusual roll drive arrangement permits wide flexibility in the choice of roll diameter. Roll speeds are synchronized electrically rather than through gears. Thus, even unmatched roll diameters can be used together successfully.

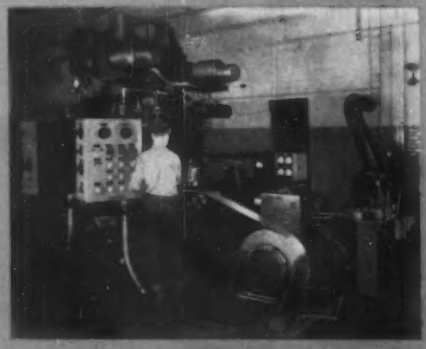
Building mill equipment to meet special needs . . . or to perform standard operations more efficiently . . . is an important reason why Bliss has become a leader in the field. If you would like more information on Bliss mill innovations, as well as details of many Bliss installations, write us today for a copy of our 60-page Rolling Mill Brochure, Catalog 40-A.

E. W. BLISS COMPANY
General Office: Canton, Ohio
ROLLING MILL DIVISION
SALEM, OHIO

BLISS
SINCE 1857

is more than a name...
it's a guarantee

The new mill has already outperformed most of the specifications set for it, rolling strip thinner, wider and faster than its original objectives of 0.010-inch gage, 12-inch width and 800 fpm speed.



Another view of the unusual new mill. Elimination of geared roll drive adapts it to use with wide variety of roll diameters to suit different rolling problems.

PLANTS: Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Pittsburgh and Midland, Pennsylvania; San Jose, California. *In Europe:* E. W. Bliss (England) Ltd., Derby; E. W. Bliss (Paris), France.

'57 Style Changes More Than Skin Deep

Only Plymouth and Mercury have really new body designs, but there are big changes in other cars if you look beyond the paint . . . Style changes must be gradual to protect used car market—*By T. L. Carry.*

◆ ARE THE 1957 CARS really all new?

Many people have been voicing complaints about the "revolutionary" models the industry was supposed to bring out this year.

The public was bombarded for months with all types of inside stories about the scope of change to be introduced on 1957 cars. But when they had a chance to actually see the new cars, they hardly lifted an eyebrow.

With the exception of the Plymouth and Mercury, just about every 1957 model bears a striking resemblance to its predecessor.

Beneath The Surface . . . Actually, there were a great many changes made in most cars. Although you might not be able to see them, they are there and in most cases they add greatly to the performance of the automobile.

Such things as new suspensions, frames and engine refinements have been added to the new cars. And just about every auto being made today is much lower than it was in 1956. In addition there are new bodies.

When Harlow Curtice, GM president, said that the 1957 cars were going to be evolutionary instead of revolutionary, he knew what he was talking about as far as appearance is concerned.

There is something to be said for the evolution of an automobile. There are many reasons why a company doesn't bring out a startling change in one year.

Disappoint, Don't Disgrace ... Most important is the used car business. How could a dealer enjoy a good used car trade if a new model looked like a rocket ship compared to a car just 1 year older? At the same time, what kind of a trade could a customer expect when buying a radically different car?

Radically new cars would obsolete just about everything else on wheels. The result would be even more rapid depreciations of older models which could lead ultimately to the failure of used car business—one of the bulwarks of new car trade.

When automobile stylists design new cars the idea is to disappoint owners of older models but not to disgrace them.

Don't think for a minute that the new models aren't really new. The industry spent at least $1 billion to tool up for 1957. And this money wouldn't have been spent if it were not necessary.

FRAME TESTING at Chevrolet Engineering Center is accomplished with sensitive instruments and heavy loads. In rigidity test (above), frame with 1500 lb load is checked for deflection at 42 points.

You May Also Feel It . . . Look at Ford Motor Co. for example. The Ford has a new body and it comes in two sizes this year. Chrysler, in addition to new bodies, has a torsion-aire ride available throughout its line as standard equipment.

Oldsmobile and Cadillac have new frames. Several of the new cars have switched to 14-in. wheels. Olds also features a printed circuit for its instrument panel.

Chevrolet, although it has not made extensive body changes, has an optional transmission purported to be the smoothest in the industry. In addition, Chevvy, along with other GM divisions, is

How Great Lakes Steel *charts* quality

Left: Thermocouple is inserted into an open-hearth furnace to check temperature of heat. Right: Multiple indicator records open-hearth temperature.

This view shows 12 of Great Lakes 17 open-hearth furnaces. Bright spots are furnaces being charged with pig iron and scrap. The open-hearth process takes from 10 to 12 hours.

This is the business end of a thermocouple, the rugged yet delicately accurate device that measures temperature in an open-hearth furnace. The two fine wires you see above, inside the casing, absorb heat and transmit it as an electrical current to be charted by recording potentiometers.

No chance for guesswork here—through eleven long hours the rising temperature of what will be 500 tons of Great Lakes open-hearth steel is meticulously controlled. Then, at exactly the right time and the right temperature, the glowing molten metal gushes into ladles for pouring into ingots.

The slender, spidery lines on the chart assure another heat of high and uniform quality steel. Quality that is checked and rechecked at every step to assure that customer specifications are met precisely.

Why don't we get together and talk over your steel needs? Some time soon?

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
DEC. 15, 1956	172,243	25,920
DEC. 8, 1956	176,288	26,002
DEC. 17, 1955	175,638	28,230
DEC. 10, 1955	184,131	28,730
TO DATE 1956	5,911,852	1,169,518
TO DATE 1955	8,050,400	1,288,100

*Estimated. Source: *Ward's Reports*

also offering fuel injection as optional equipment for those who can afford it.

So, if you don't think the '57 models look new, there is only one way to make sure. Get in and drive one and you will not only see the difference, you will feel it.

Unit Body:

Lincoln may be first to follow AMF lead.

Rumors still persist in the industry that more than one automaker will soon be switching to the unitized type of body construction now being used at American Motors Corp.

It is no secret that the Lincoln will be the first of the Big Three to switch to the unit body. It's possible that the switch could be made in time for the 1958 model.

That's the year that the Lincoln is due for a major change. Also, the luxury car will soon be produced at a new plant in nearby Novi, Mich.

This, incidentally, will be the only plant where Lincolns will be produced and may be one of the factors involved in the choice of a unit body.

It is unlikely that any other car makers are considering the switch in the immediate future, although the whole Ford line may change over eventually.

Biggest drawback to any major shift is cost. The basic changes in tools for a volume manufacturer would be too high when you consider the number of assembly plants across the nation that would be affected.

Like anything else in the auto industry a basic switch in bodies is measured against this yardstick: Is the additional cost worth the improvements to be realized?

This is not to say that the unit body is any better or worse than the standard frame. But if it is better, how much better is it and is the cost worth the improvement?

New Chrysler Plant

Construction of the Chrysler Corp. stamping plant at Twinsburg, O., is on schedule and some of the equipment to be used is now being installed in the manufacturing area.

Plans call for partial production to begin next February when 8 of the 28 major press lines in the plant will be in operation.

Altogether 260 presses will be operating in the plant when it is completed.

Five of these presses will be real monsters, weighing 600 tons each with a stamping force of 1800 tons. The majority of the presses will weigh between 300 and 400 tons and will operate at speeds between 10 and 30 strokes per min.

The plant will employ 3500 workers when the whole project is completed early next summer. Chrysler will produce stampings for its complete line of cars at the plant.

AUTOMOTIVE NEWS

Construction at Twinsburg marks a further step in the trend of auto companies to move their facilities closer to the source of supply of raw material.

Twinsburg is close to Cleveland and is practically in the middle of one of the largest steelmaking centers in the country.

Auto Output Gains

Automobile assembly operations are finally starting to get off the ground in Detroit. Ward's Automotive Reports says that the industry had its best week this year with production of 170,398 units.

At the same time retail sales for the month of November are estimated at 465,000 cars, a gain of 12 pct over October.

Indications are now that the industry will be able to reach its December goal of a little over 600,000 cars. It will be the first time the goal has been reached since 1957 production started.

Production fell off sharply during October and November.

THE BULL OF THE WOODS By J. R. Williams

Keep 'em rolling with Texaco

YOU'LL consistently get high-rate, uninterrupted production from your roll stands when *Texaco Regal Oil* goes into the circulating systems.

Texaco Regal Oil has exceptional resistance to oxidation, emulsification and sludging. It keeps lines clear for a free flow of lubricant, keeps oil film bearings clean and fully protected, keeps bearing temperatures normal even under extra-heavy loads. Naturally, rolling efficiency goes up, unit costs come down.

To keep enclosed reduction gears and their bearings running smoother longer, use *Texaco Meropa Lubricant*. It resists oxidation, thickening and foaming, stays stable under extreme pressures.

Put Texaco to work in your mill and enjoy dependable, economical operation through effective lubrication. Get full details from a Texaco Lubrication Engineer. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

Why Foreign Aid Will Be More Costly

Congress and Administration are sympathetic to oppressed areas of Europe . . . Chances are, request for foreign aid spending won't be pared drastically . . . Fairless will report—By G. H. Baker.

◆ THE HIGH COST of foreign aid is going higher. The new aggressive thrusts by Communists are to blame.

The Administration's foreign-assistance experts say they'll need "at least" $4 billion to combat Communism in the fiscal year that starts July 1. They hint further that the exact amount they'll ask from the new Congress probably will be closer to $5 billion than $4 billion.

Although Congress traditionally trims down requests from both Republican and Democratic Administrations for foreign aid money, the temper of leaders who will call the plays in the new Congress indicates that the Eisenhower Administration has a better-than-average chance of obtaining all or nearly all of what it asks in the way of foreign aid.

There's a strong wave of sympathy among members of both parties for the oppressed Hungarians and Poles, for one thing. And the countries of Western Europe are impressing our State Department with their needs for oil and other fuels, now that it is evident that the Suez Canal will be closed for repairs until next spring.

In the current fiscal year (which ends next June 30) the Administration is planning to spend about $3.7 billion on foreign aid. It originally asked for $4.9 billion.

Ike's Message . . . The future of foreign aid will be outlined next year in two separate reports from the White House, instead of one report as has been the case.

In late January, President Eisenhower will send to Congress his recommendations for running the overseas aid program for the 12 months beginning next July, together with his estimate of what it will cost.

About 60 days later, Mr. Eisenhower will send to Congress a second set of recommendations dealing with the future of foreign aid, this time devoting his special message to broad policy recommendations explaining his long-run views on the "philosophy" of U. S. spending to defeat Russian-type Communism.

Fairless Report . . . A committee of businessmen headed by Benjamin F. Fairless is writing a report for Mr. Eisenhower on ways to get the U. S. foreign aid program on a more efficient basis. This report is due on Ike's desk next March—too late for inclusion in Mr. Eisenhower's January message on foreign aid.

But the Fairless report will provide a substantial part of the long-run recommendations that Mr. Eisenhower will make.

The Fairless Committee is not expected to recommend—or even suggest—any substantial reduction in the continuing program of aiding other nations.

The report will instead confine itself to suggesting ways for getting more for the taxpayers' foreign aid dollar.

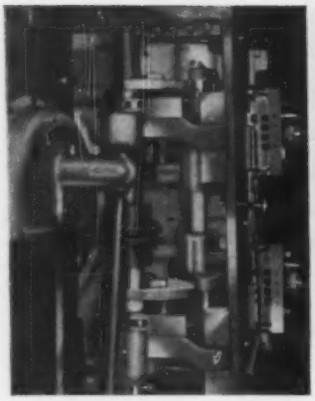
Why Military Spending Goes Up and Up

▪ **You can get an idea of how the number of employees in the Defense Department keeps nudging upward by glancing at these new figures on total civilian employment in the national military establishment:**

	October	September	Increase
Army	433,403	432,969	434
Navy	393,649	393,168	481
Air Force	354,576	352,364	2,212
Secretary of Defense	1,742	1,692	50
TOTAL	1,183,352	1,180,193	3,159

▪ **Point is, these figures tend to grow, month by month. In the Air Force, for example, civilian employment has increased in 17 of the past 18 months.**

▪ **The total military payroll (including pay, food, clothing, health, and housing) for both civilian personnel and those in uniform, accounts for nearly half of the annual $36 billion-plus military budget. And the Pentagon indicates it may have to raise pay even higher to encourage reenlistments.**

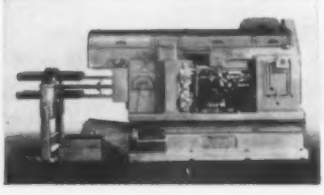


Conomatics Provide Radial Screw Adjustment of Forming Tool Slides

- Models 2⅝" LA, 3½" AD, 5" KL, and 5¼" KR Conomatic Four Spindle Bar Machines are equipped with a number of quick job-change features. One of these is the all-position end attachment drive for the mounting of endworking opposed spindles in all positions, with independent feed to as many as three opposed spindles on a single setup.

Another feature that is of considerable importance in tooling up is the radial screw adjustment of all sideworking slides. Trial cuts may be taken to correct diameters with form tools without changing the clamped positions of the form tool holders.

All Conomatic quick changeover models are equipped with dial adjustment of the working stroke of all tool carrying slides. Besides the Four Spindle machines there are three quick change Six Spindle models in 9/16", 1" and 1⅝" sizes.
Write, wire, or phone for literature.



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

Product Variety Adds Spice to Expansion

Wide, wide range of equipment made or assembled in the Farwest means broadening of metalworking's base . . . Fisher Body Div. will add to its facilities . . . Boeing plans guided missile plant—*By R. R. Kay.*

◆ THERE'S MORE to the story of West Coast industrial growth than the impressive number of new and expanding metalworking firms and suppliers. Steadily on the rise is a wider variety of products made or assembled in the area.

This broadening of metalworking's base spells out a stronger and more diversified economy for the region. Take a look at some of the latest projects. These are companies in the market for your products and services:

From Electronics to Bikes . . . Litton Industries, Inc., Beverly Hills, Calif., will spend $1 million for new equipment to expand electronic products manufacture. Oakland Aircraft Engine Service, Oakland, Calif., is investing $300,000 in new machinery and equipment to go into a $340,000 building.

Wheel Craft, Inc., Div. of Monark Silver King, Inc., has a 100,000-sq ft plant going up at Azusa, Calif. Firm makes bicycles, sidewalk bikes, velocipedes; also produces aircraft and commercial castings. S & M Manufacturing Co. is moving to Glendale, Calif., to produce printing plant and materials handling equipment.

Fisher Body Expands . . . Parker Brush Co., Santa Clara, Calif., is opening shop for production of industrial brushes. P. R. Mallory & Co., Inc., plans a North Long Beach, Calif., plant to turn out its television components and resistance welding materials. Specialized Trailers, Inc., will build a North Hollywood, Calif., facility to make commercial trailers.

The Port of Los Angeles is kicking off a $101 million 15-year expansion program — will double harbor's cargo-handling capacity. Fisher Body Div. of General Motors Corp. will add 42,000 sq ft to its Oakland, Calif., facilities. Aluminum Co. of America will spend $500,000 to increase facilities at Vancouver, Wash.

Budger Mfg. Co., Inc., is pushing out the walls for more space at its Sun Valley, Calif., plant. Company makes expandable type mobile homes. Allied Engineering Co., Alameda, Calif., will spend $100,000 to get going on manufacture of hydraulics and nuclear equipment. Industrial Casting Corp., San Leandro, Calif., has $200,000 earmarked for more precision castings facilities.

Metal Finishing Too . . . Niles Machine & Tool Works, Newark, Calif., will expand its general machine work. And National Iron Works, Inc., Alameda, Calif., will invest $80,000 to handle more steel fabricating. Added electrogalvanizing facilities will go in at Pacific Rustproofing Co., Oakland, Calif. And Johnson Metal Finishing, Inc., plans a larger plant to handle aluminum conversion coat processing.

Wire Products, Guided Missiles . . . The Wilkinson Co., is moving into a new Santa Monica, Calif., plant where it will step up its production of metal alloys and fine wires for electronics and dentistry. William I. Mann Co. is adding to its Monrovia, Calif., shop for greater turnout of precision optical and electronic components.

Boeing Airplane Co., Seattle, Wash., optioned a second site in California for its giant Bomarc supersonic guided missile plant.

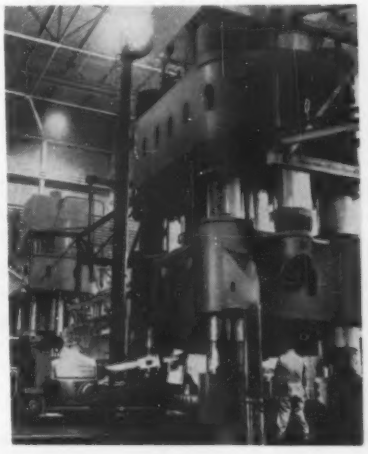
New Forging Press Puts Aluminum Into Shape

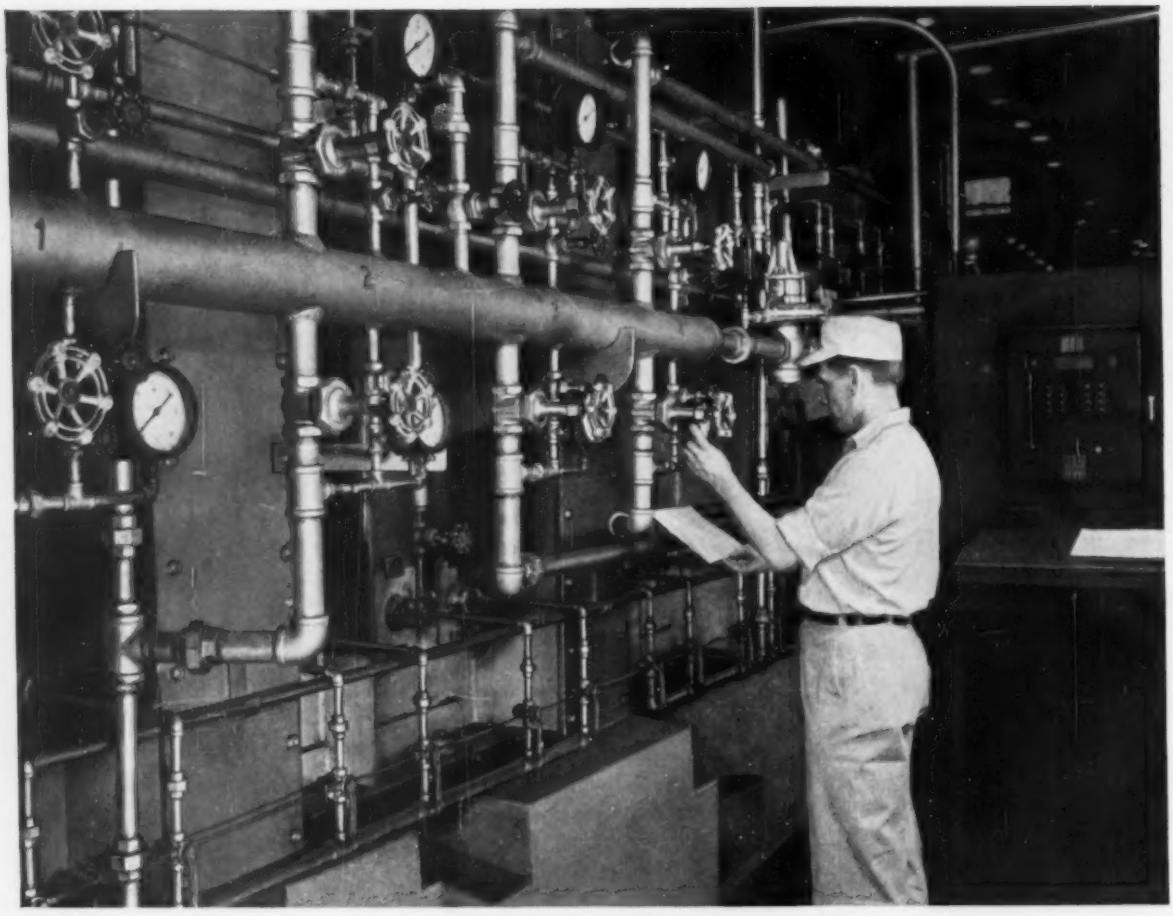
◆ CAPABLE of applying 8000 tons pressure, this new hydraulic forging press is now in operation at the Harvey Aluminum plant in Torrance, Calif.

It turns out precision forgings for use at key structural points in present and future aircraft and missiles.

One of a battery of presses now in operation at the facility, the press is described as enabling forging of larger conventional and greater precision parts.

Unit has an over-all height of 53 ft. Behind it is a 4000 ton capacity unit.





TUBING MACHINABILITY STARTS HERE

Machinability can be a critical factor in the economical production of mechanical parts from tubing. This important characteristic of many alloy steels is largely determined by various types of heat-treatment. That's why uniform tubing machinability requires *precise control* of the heating and cooling cycle of the heat treating operation.

John Fencil, a furnace operator, is shown at work on one of the many heat treating furnaces at B&W. By regulating the 128 burners, 22 flues and 145 valves on this specially designed furnace he can completely control the heat treating cycle. Specialized furnaces such as this and trained operators like John assure that B&W alloy mechanical tubing is uniformly heat treated for economical parts production. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-6042M

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels

MACHINE TOOL HIGH SPOTS

Code Improves U.S. Machinery Guide

The Dept. of Defense directory, just published, features number system for describing tool operations . . . Code is adaptable to accounting machines . . . American machine exports climb—*By E. J. Egan, Jr.*

◆ WANT TO KNOW exactly who makes what in machine tools? You can find out by checking the 1956 Edition of the Dept. of Defense Directory of Metalworking Machinery. It's just off the press, costs $6.25 per copy, and is available from the Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C.

It lists every active U. S. builder of metalworking equipment that the Dept. could track down in over two years of searching. It covers past and present machine items made by each firm, and gives a description, model designation and rated capacity for every tool.

A unique feature of the book is the Production Equipment Code number (formerly Standard Commodity Code) which accompanies each machine description. This provides a common terminology for machines that, although they perform the same or similar functions, are often called by different names.

Aids Inventory Taking . . . The book should be of great help for buyers seeking a number of possible sources for a particular machine tool item. It will also help buyers and sellers of used equipment to furnish adequate and exact descriptive information for tools whose only identifying marks may be a nameplate and a model number.

Organizations that own many different types of machine tools should find the Production Equipment Code numbers helpful for inventory records. These numbers are especially adaptable to electrical accounting machine tabulations. The Dept. of Defense uses them in this way to collect, transmit, correlate and review data on the thousands of machine tools owned by the military services.

U. S. Labels Preferred . . . Manufacturers in foreign countries seem to prefer American-built machine tools to a much greater degree than U. S. metalworking firms use foreign-built equipment. This applies even though (1) U. S. exports are hampered by high tariffs and dollar shortages, and (2) foreign tools can be delivered here at relatively modest prices.

During the past several years, U. S. builders have enjoyed an increasing annual volume of orders from foreign customers: 1952—$54 million; 1953—$56 million; 1954—$56.3 million; 1955—$81 million; 1956—$101 million (estimated).

"We wonder if you could settle a little disagreement for us?"

Over the same period, American imports of foreign tools have been at considerably lower dollar levels, and in a general downward, rather than an upward trend: 1952—$38 million; 1953—$30 million; 1954—$16.6 million; 1955—$12 million; 1956—$17 million (estimated).

The Uninvited . . . The figures on U. S. exports do not include sales of American machine tool designs which are built by overseas contractors or in the foreign-branch plants of U. S. builders. These sales must account for considerable extra volume, inasmuch as 23 American builders have licensed 34 overseas contractors, and seven U. S. firms operate a total of nine machine tool plants in England and Europe.

On the other hand, the estimated $17 million's worth of foreign tools that Americans will import this year isn't exactly peanuts. Before the Korean episode, annual sale of such tools in this country came to only $1.5 or $2 million.

It's not known whether the popularity of U. S. machine tools in Europe influenced the decision, but it's a fact that American builders will no longer be invited to exhibit at the European Machine Tool Show. Next one is scheduled for Hanover, in September, 1957. The 1958 Show will probably be in Paris.

In a Mess?

CALL "ELL" AND "ESS"!

The best laid new product plans sometimes bog down because of fastening problems.

On paper the product looks good—*is* good . . . is designed in every way for efficiency and salability.

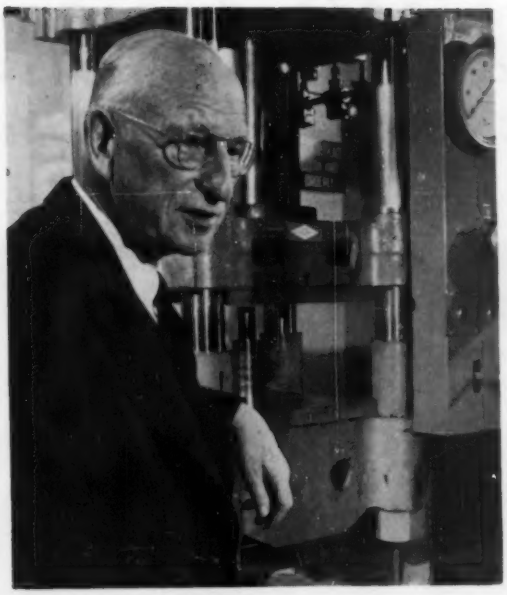
But putting it together may be another story. Special type bolts or nuts may be required to do the job right.

Whenever a "crisis" like this turns up, call in "ELL" & "ESS", the helpful Lamson & Sessions "can do" pair. They can engineer the required fastener, they can make it and many times they save you money.

The LAMSON & SESSIONS Co.

1971 West 85th Street • Cleveland 2, Ohio

PLANTS AT CLEVELAND AND KENT, OHIO • BIRMINGHAM • CHICAGO



The Iron Age SALUTES

L. Gerald Firth **Like his father, grandfather and great grandfather, he pioneered in metals at an age when most men retire. He made important contributions to the development of stainless steel, carbides and tool steels.**

The last time L. Gerald Firth tried to retire, he bounced back into business like a rubber ball. This time he is "stepping aside" as president of Firth-Loach Metals, Inc., admitting he will still be around as director and consultant.

When you spend 40 years in the steel and carbide business, you can't walk out of the plant one day and be content at gardening alone—which happens to be one of Mr. Firth's favorite pastimes.

The momentum of four decades just doesn't come to a screeching halt at the drop of a pencil. When you spend time gardening, you think. And when you think, your thoughts are bound to center on the business you spent 40 years in.

Mr. Firth's family heritage in specialty steels goes back more than 110 years. In 1842 his great grandfather founded Thomas Firth & Sons at Sheffield, England. His father was founder of Firth Sterling, Inc., Pittsburgh.

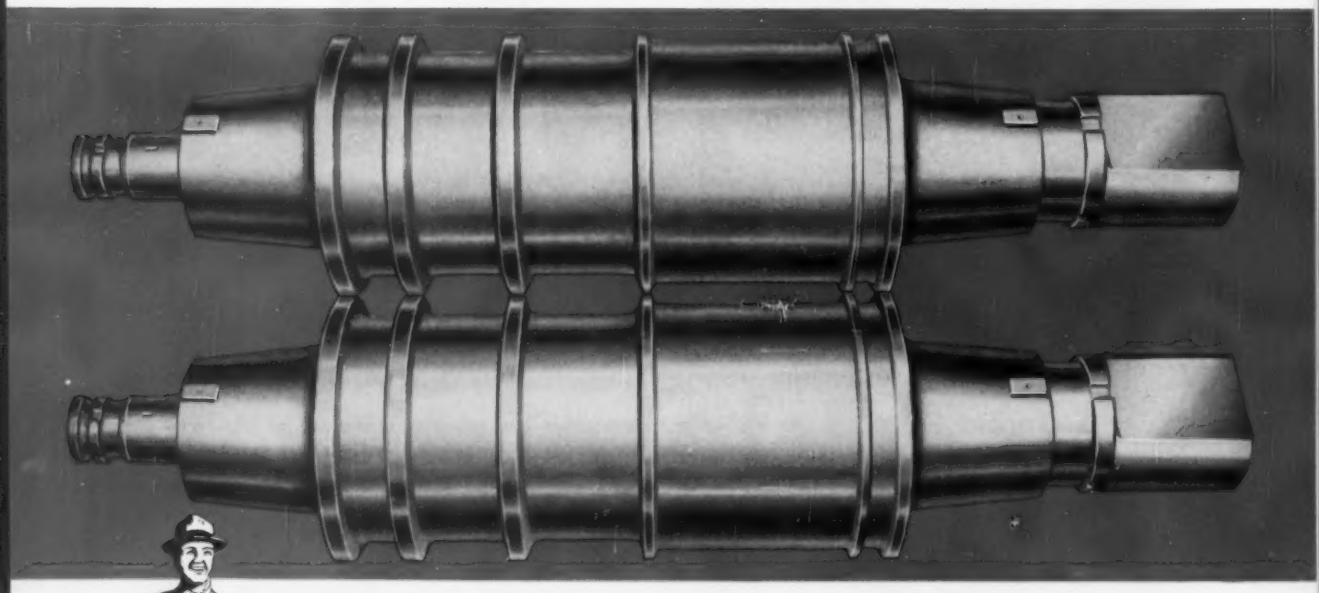
Born in England, educated at Oxford, Gerald Firth witnessed the first production of Harry Brearley's patented stainless steel in 1913. The next year he came to America and brought a first-hand knowledge of this new steel to his father's firm. He worked in the company's research lab and was instrumental in developing high speed steels and high carbon, high chrome tool steels.

In 1928 he recognized the tremendous potential of tungsten carbide as a cutting material. With L. Gerald as president, Firth Sterling became a major U. S. carbide producer. Then in 1953 he retired.

Scarcely three months later he was back in harness, persuaded by friends to head a new carbide firm—Firth-Loach Metals, Inc. That company is now established, and Mr. Firth is making way for the younger fellows. But the way the ball has been bouncing, industry probably will be hearing more of him.

Ohio Rolls

correct roll design— rigid quality controls— where roll life begins!



The service life of Ohio Rolls begins with integrated planning by a group of specialists analyzing roll requirements . . . Ohio's designers—metallurgists—chemists —engineers—foundrymen—and inspectors . . . working directly with your Ohio Roll Representative. Their job is to make sure that Ohio Rolls meet rigid job specifications—in design, metal analysis, hardness, tensile strength, dimension and finish. These are operations that require specific planning to make certain that Ohio Rolls deliver High Tonnage . . . give Long Life . . . and Satisfactory Service.

OHIO ROLLS SERVE THE WORLD

When you need rolls—large or small—call in your Ohio Roll Representative. He understands production requirements, and he can help you solve your roll problems quickly and efficiently.

shaping metal for all industry

Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Ohio Double-Pour Rolls
Chilled Iron Rolls
Denso Iron Rolls
Nickel Grain Rolls
Special Iron Rolls
Nioloy Rolls
Flintuff Rolls
Forged Steel Rolls

THE OHIO STEEL FOUNDRY COMPANY

LIMA, OHIO

Plants at Lima and Springfield, Ohio

ORD

The Iron Age INTRODUCES

U. T. Kuechle, named vice president, **A. O. Smith Corp.,** Milwaukee; **Roy A. Dingman,** named vice president; **Robert A. Rietz,** named asst. secretary.

Lester R. Naragon, named treasurer, **Great Lakes Steel Corp.,** Detroit, unit of National Steel Corp.

Earl Hottel, named head, Service and Parts Dept., **Lectromelt Furnace Co.,** Pittsburgh.

Sydney E. Cowlin, appointed director, market research, **Eaton Manufacturing Co.,** Cleveland.

Clyde A. Rogers, named assistant superintendent, oxygen steelmaking production, **Kaiser Steel Corp.,** Fontana, Calif.

Francis M. Wistert and **Robert E. Valk,** elected vice presidents, **The Electric Auto-Lite Co.,** Toledo, O.

Dr. R. B. Corbett, appointed director, metallurgy, and **J. M. Ford,** named superintendent, Consumable Electrode Vacuum Melting Dept., **Midvale-Heppenstall Co.,** Philadelphia.

Joseph P. Crosby, vice president, sales, **The Lapointe Machine Tool Co.,** Hudson, Mass., announces appointment of **Paul N. Stanton** as sales manager.

Harold E. Engelbaugh, named general manager, steel operations, **The Youngstown Sheet and Tube Co.,** Youngstown, O.

Rod T. Davies, named manager, aluminum sales, **Wolverine Tube, Div.** of Calumet & Hecla, Inc., Detroit; **Robert C. Crowe,** appointed manager, industrial sales; **E. W. Ervasti,** named general sales manager, Calumet & Hecla of Canada Ltd.

Myron L. Ball, named district sales manager, Atlanta, Ga., Power Piping & Sprinkler Div., **Blaw-Knox Co.,** Pittsburgh.

Fred G. Brear, appointed asst. sales manager, southern district sales office, **Kaiser Steel Corp.,** Los Angeles.

W. L. Wiese, named midwestern sales manager, **Clipper Diamond Tool Co., Inc.,** New York.

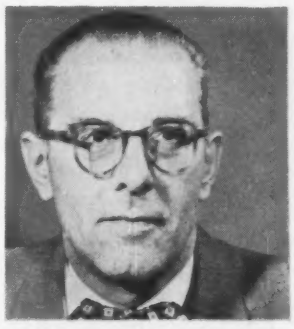
Frederick C. Jones, appointed manager, regional foil sales, **Kaiser Aluminum & Chemical Sales, Inc.,** Cleveland office; **S. P. Whiteside,** appointed staff asst. to asst. general sales manager.

Claude L. Alexander, appointed general sales manager, **Sun Tube Corp.,** Hillside, N. J.

Howard A. Steele, appointed market research analyst, **The National Supply Co.,** Pittsburgh.

RICHARD F. SENTNER, named executive vice president—commercial, U. S. Steel Corp., Pittsburgh.

ROBERT L. BRAMMER, elected vice president, sales, and director, Ackermann Manufacturing Co., subsidiary of Wheeling Steel Corp.



CHARLES A. WILLIAMS, elected vice president, sales, Johnson Bronze Co., New Castle, Pa.

ROBERT E. BUCKHOLDT, named manager, engineering, Selas Corp. of America, Dresher, Pa.

Dr. A. W. Downes, named general manager, new resins and compounds, Plastics Div., **Bakelite Co.,** Div. of Union Carbide and Carbon Corp.

John R. Duffy, named chief engineer, **Lindberg Engineering Co.,** Chicago. **Donald R. Grandy,** named engineering and technical consultant, Cleveland division office.

R. D. Baker, Jr., named asst. sales manager, Coke and Iron Div., **Pittsburgh Coke and Chemical Co.**

Thomas W. Allison, named sales manager, **Aluminum Foils, Inc.,** Jackson, Tenn.

Richard H. Schoemann, appointed standards engineer, materials and process section, Standards Engineering Dept., **Sperry Gyroscope Co.,** Div. of Sperry Rand Corp.

James F. Jones, named manager, Milwaukee Automotive and Railroad Products Divisions, **A. O. Smith Corp.,** Milwaukee.

Cornelius L. Hudak, named sales manager, Rolling Mill Div., **The Plume & Atwood Mfg. Co.,** Thomaston, Conn.

Rovan A. Wernsdorfer, appointed northeastern regional service manager, **The Black & Decker Manufacturing Co.,** Towson, Md.

Owen J. Roberts, named press service manager, Hamilton Div., Hamilton, O., of **Baldwin-Lima-Hamilton Corp.,** Philadelphia; **Alfred L. Stoops,** appointed press sales engineer, Cleveland office.

Robert Lyle, appointed chief chemist, **National Electric Products Corp.,** Pittsburgh.

Following appointments are within the industrial products group of **National Carbon Co.,** Div. of Union Carbide and Carbon Corp. **Robert J. Zavesky,** named district works manager, Columbia and Lawrenceburg, Tenn., plants; **Carl E. Stollenmeyer,** named plant manager, Fostoria; **C. J. Parks,** named plant manager, Cleveland.

JOHN H. DOLAN, named general manager, Chicago operations, The Lamson & Sessions Co.

A. H. SCHOTT, named general manager, Crankshaft and Camshaft Div., Ohio Crankshaft Co., Cleveland.

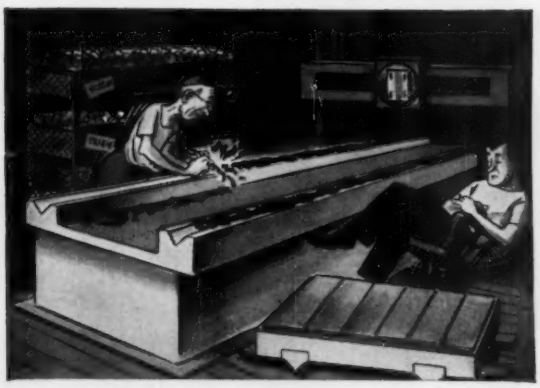
KEITH HALL, named director, industrial markets, Reynolds Metals Co., Louisville, Ky.

CLINTON E. SMITH, named asst. to general sales manager, Pratt & Whitney Co., Inc., W. Hartford, Conn.

1. Cures "stick-slip" or "jumpy table". When a table gets the "shakes", especially after it has just reversed or when the load is heavy and the speed slow, it's probably suffering from "stick-slip". Remedy—Sunoco Way Lubricant®. Special polar compounds in Sunoco Way Lubricant form a friction-reducing film that keeps a table sliding smoothly under all operating conditions.

2. Doesn't squeeze out. When you use a heavy oil as a way lubricant, you must use a lot of oil to maintain a thick enough film. But, heavy oil squeezes out if the table sits in one position very long. You have a tough time getting the table moving again. Protected by the tenacious thin film formed by Sunoco Way Lubricant, the machine can be idle for a week and it will start easily.

WHY SUNOCO WAY LUBRICANT CAN HELP CURE YOUR MACHINING PROBLEMS



3. Protects expensive ways. Badly scored or pitted ways, caused by inadequate way lubrication, result in lost production and expensive repairs. The high film strength of Sunoco Way Lubricant eliminates the danger of metal-to-metal contact, the chief cause of scoring and way wear. Excellent metal-wetting and non-corrosive properties eliminate rusting and pitting.

4. Approved by more than 55 machine-tool builders. Every major machine-tool builder has tested Sunoco Way Lubricant. It is always approved. In fact, to assure maximum efficiency of their product, many manufacturers ship a supply of Sunoco Way Lubricant with each machine. We'll be glad to send you the list of manufacturers who have approved Sunoco Way Lubricant.

For more information, see your Sun Representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-12

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

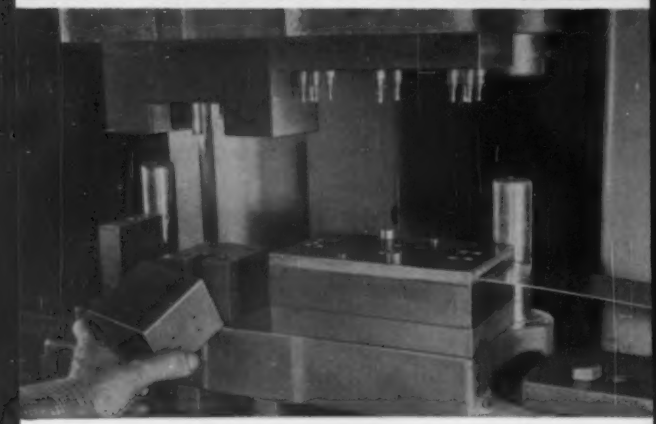
PHILADELPHIA 3, PA. ©SUN OIL CO.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO and MONTREAL

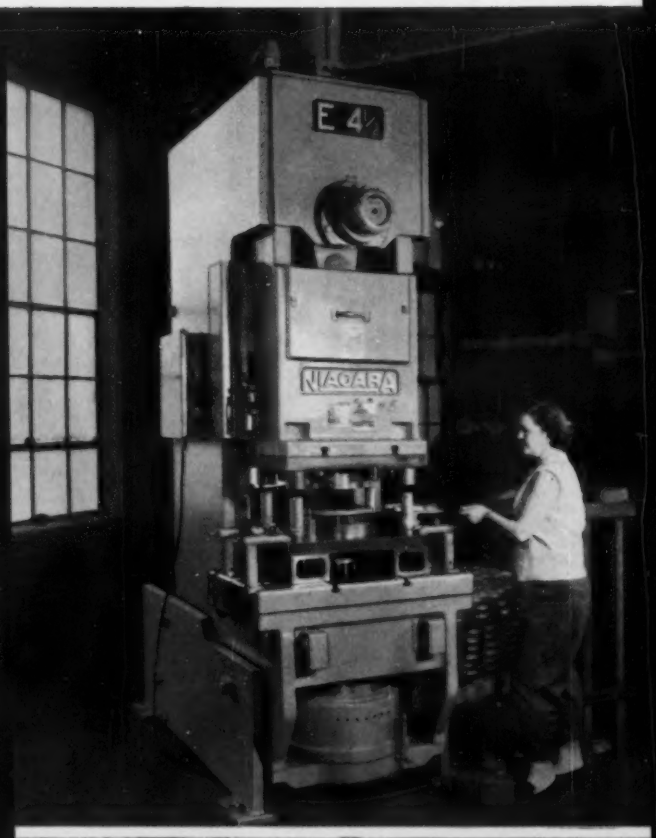
SUNOCO®

Take it from the early birds...

"IT'S THE GREATEST



Niagara Series E 4½ OBI Press in operation at a well known eastern commercial stamping plant. Work includes stamping small wrenches; trimming canopies for electrical fixtures; piercing, cutting off and forming saddles with a progressive die (shown).



Niagara Series E 4½ OBI Press engaged in blanking and drawing of kitchen cannister lids from half-hard aluminum at midwestern housewares manufacturing plant.

"we can produce from 8,000 to 10,000 pieces in an eight hour day"

"much safer press"

"takes less floor space"

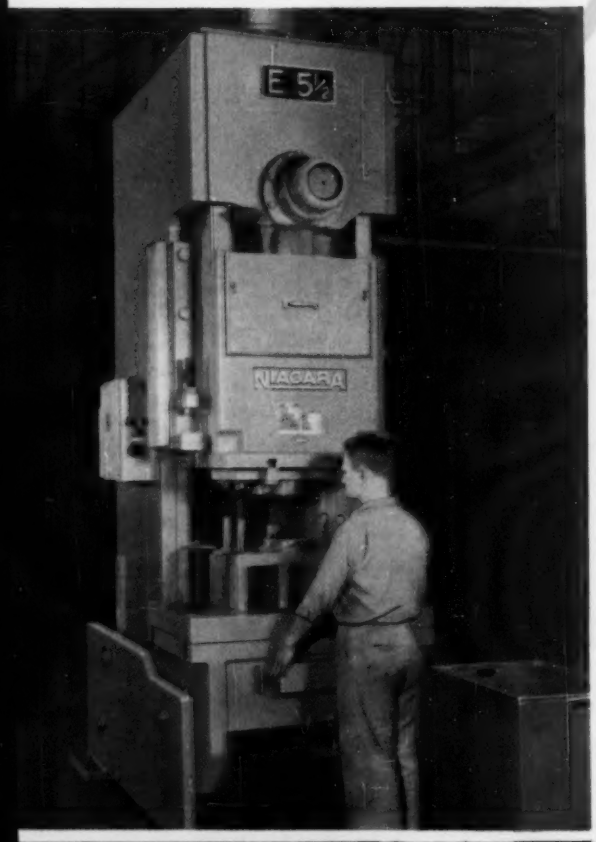
"has a centralized pressure lubricator which we like very much"

O.B.I. EVER BUILT"

"we find that dies without posts work much better on this press"

"all dies give better and longer runs"

"large slide area for large trimming, blanking and progressive dies"



Niagara Series E 5½ OBI Press forming and trimming hemispherical copper parts for one of the "Big Two" electrical manufacturers.

Few developments in metalworking history have drawn the enthusiastic endorsement given Niagara's revolutionary Front-to-Back Crankshaft OBI Press.

Now, as at the 1955 Machine Tool Show where it was unveiled, there is *nothing* even remotely resembling it in the industry... design-wise and production-wise.

Customers in U.S. and Canada... the "early birds" who are doing their modernizing with the most modern press of all... can today tell you about accomplishments with this newest and greatest of OBIs that you would have never dreamed possible. Yes, the press that Niagara conceived to do more than any OBI ever built is doing just that for a fast-growing list of metalworking plants.

There's a huge fund of successful experiences that a Niagara representative can share with you today. Draw on it now and utilize it in your modernization plans. Make a date, at your convenience, for a personal call.

...and if you haven't received new Bulletin 56 with complete design description and specifications (75-200 ton capacities, 4½-7½ inch shaft diameters, standard and automated models) write for your copy at once. You will find it invaluable to your planning.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N.Y.

DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U. S. cities and major foreign countries

•

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

NIAGARA

front-to-back crankshaft INCLINABLE PRESSES

PERSONNEL

R. J. Sullivan, named director, quality control, **Vickers Inc.,** Detroit.

S. E. Havens, appointed district manager, Pacific Coast territory, Wright Hoist Div., **American Chain & Cable Co., Inc.,** York, Pa.

E. S. McCormick, named general sales manager, Buffalo-Springfield Roller Div., **Koehring Co.,** Springfield, O.

William L. Van Winkle, appointed steel mill roll sales representative, Pittsburgh area, **Birdsboro Steel Foundry & Machine Co.,** Birdsboro, Pa.

Mahlon E. Wood, named special representative, Automotive Market Sales Div., **Reynolds Metals Co.,** Louisville, Ky.

Russell S. Rockafellow, appointed director, production engineering, manufacturing staff, **Chrysler Corp.,** Detroit.

Donald M. McGrath, named San Diego plant manager, **Solar Aircraft Co.,** San Diego, Calif.

A. L. Peake, appointed asst. manager, central district sales office, **Kaiser Steel Corp.,** Oakland, Calif.

Thomas A. Morris, appointed asst. director, contract hardware distribution sales, **The Yale & Towne Manufacturing Co.,** White Plains, N. Y.

OBITUARIES

Victor Mauck, 82, retired chairman of the board, **John Wood Co.** and **Nicolet Industries, Inc.**

John F. Shea, 51, vice president, sales, Becco Chemical Div., **Food Machinery and Chemical Corp.,** Buffalo, N. Y.

Keith Reeves Rodney, 81, a director, **Edgcomb Steel and Aluminum Corp.,** Hillside, N. J.

Edward L. Parker, chairman of the board, **Columbia Steel and Shafting Co.**

IDEAS...*on making the most of wire cloth!*

● Unless you're in the business up to your ears, you'd hardly be aware of the infinite variations that can be offered today in industrial wire cloth. Not only variations in the wire, metal, weave and mesh, but also in finishes, coatings, roll lengths, widths and packaging. And the *Reynolds Wire Division* of National-Standard has carried this flexibility to a high point in the industry.

So, you can see that it is mighty important for users or fabricators to probe today's possibilities carefully, and to be *sure* they are getting *the* wire cloth that produces best, performs best, minimizes waste, and costs the least for their particular production.

And that is exactly why *Reynolds Wire Division* goes all out in furnishing technical and analytical service—service that benefits customer after customer, small or large. This exceptional service is available coast to coast . . . wherever you are.

Are you open to some ideas on making the most of wire cloth? Do you have any particular production problems in the use of wire cloth? Let's discuss your requirements.

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
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70 minutes cut

on combined blanking and punching operations!

—**FORT WAYNE STRUCTURAL STEEL CO., Inc.**
Fort Wayne, Ind.

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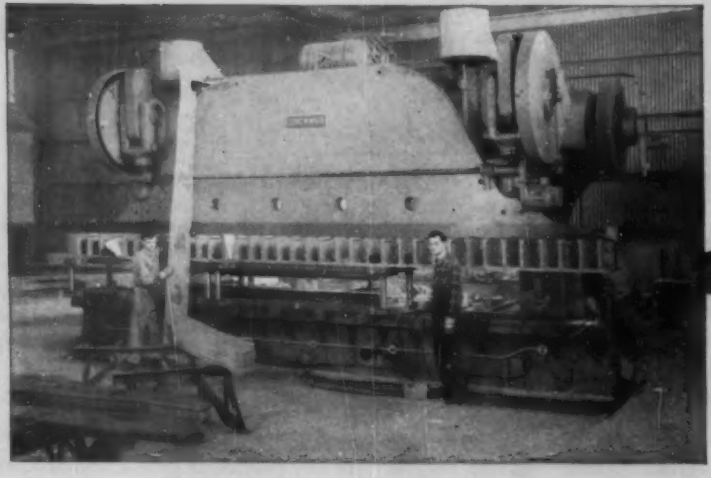
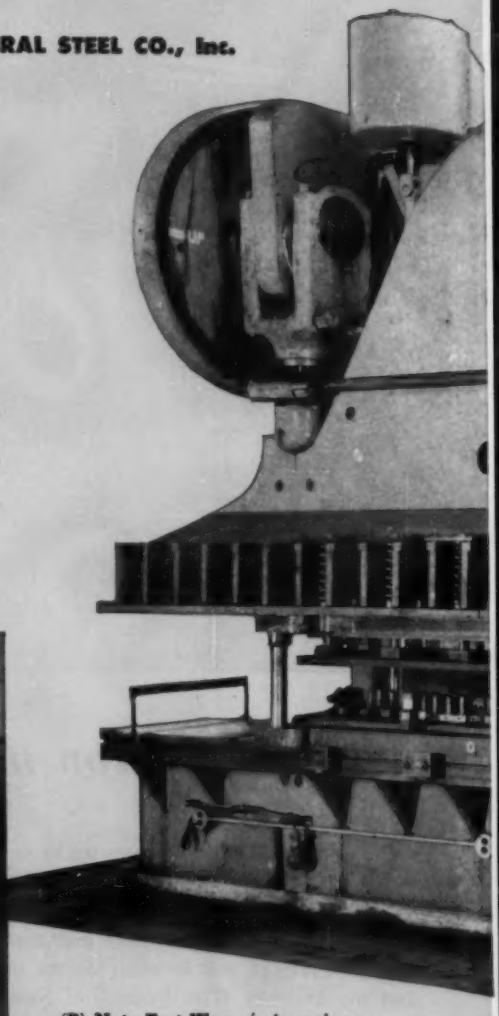


(A) Blanking floor to floor time 1¼ minutes. Previous time 34 minutes.



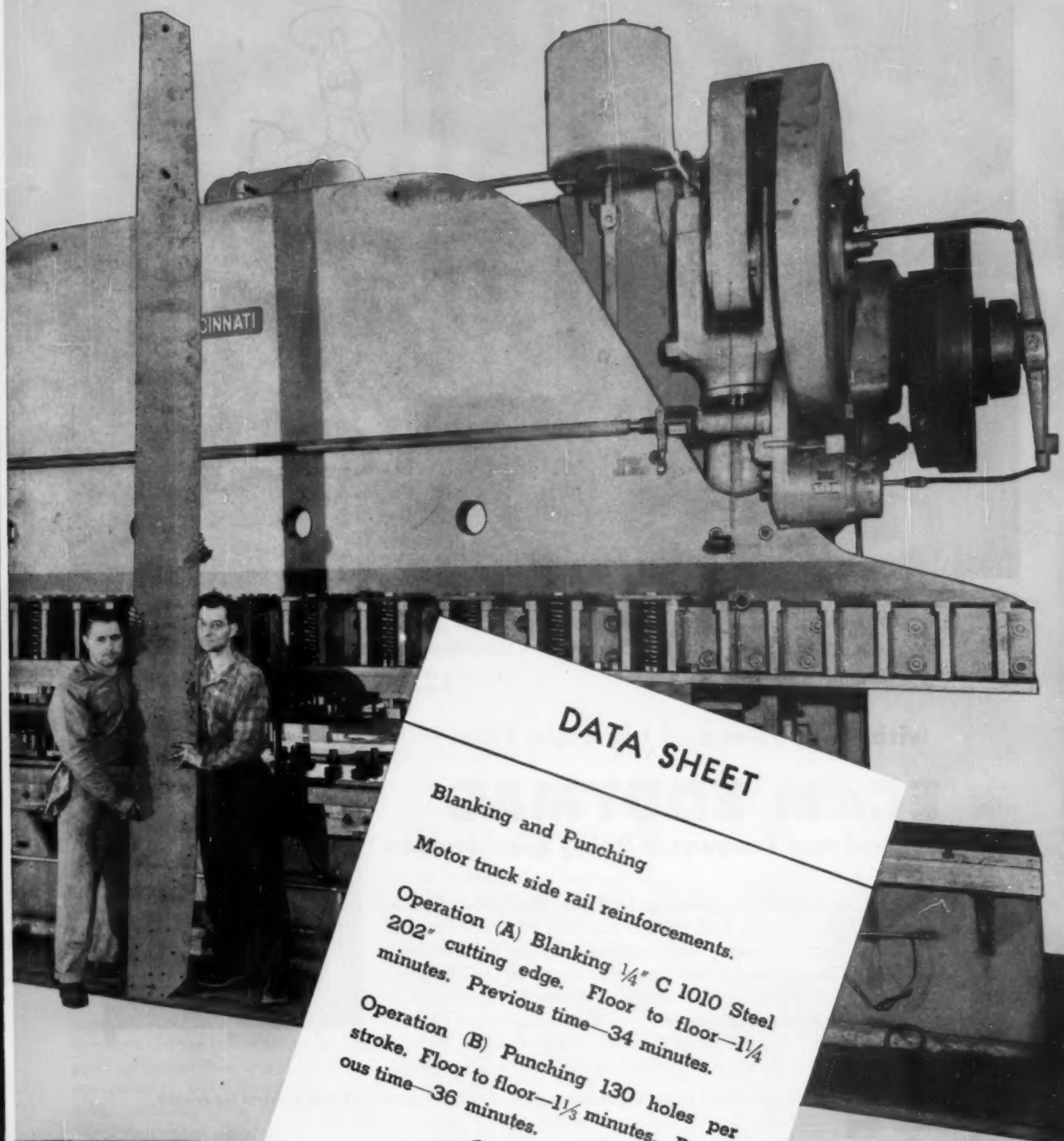
(B) Note Fort Wayne's ingenious punching equipment which reduced punching time from 36 minutes to 1½ minutes and took advantage of every versatile Cincinnati feature.

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

to 2.6 minutes...



DATA SHEET

Blanking and Punching

Motor truck side rail reinforcements.

Operation (A) Blanking ¼" C 1010 Steel 202" cutting edge. Floor to floor—1¼ minutes. Previous time—34 minutes.

Operation (B) Punching 130 holes per stroke. Floor to floor—1⅓ minutes. Previous time—36 minutes.

John L. Hayner
President

Photos Courtesy—
FORT WAYNE
STRUCTURAL STEEL CO., Inc.
Fort Wayne, Indiana

FEATURE ARTICLES

Improved properties—

Microstructure: Guide To Better Alloys

◆ For a long time, metallurgists have concerned themselves with microstructure largely as a means for controlling manufacturing processes . . . Is this a fundamental approach or merely an expedient?

◆ Many of our alloys are actually products of expediency . . . New and improved materials are being designed on the basis of microstructures that provide optimum properties.

By W. R. HIBBARD, JR., Manager, Alloy Studies Research, General Electric Research Laboratory, Schenectady, N. Y.

◆ MICROSTRUCTURES of metals are useful guides to the scientist. Frequently, a single photograph of a metal's structure holds the key to solving an intricate metallurgical problem. Just as often, this same photograph contributes to the elimination of more expensive tests, needless expenditures of time and money.

Interest in a metal's microstructure took root more than a century ago. In the intervening years, great progress has been made in recognizing, documenting, and using metallographic structures.

An important step in this progress was the discovery that many basic properties could be definitely linked to specific structures. This meant that many of the intricacies of a metal's performance could be readily predicted from a study of its microstructure.

What *are* some of the relationships that can be learned from a metal's microstructure?

For one, there is the relationship that exists between grain size and hardness or strength. In the case of steel, we can safely predict that the finer grained material is likely to be stronger.

There are, of course, many other clues that can be gleaned from microstructure. It provides us with a means for detecting deformation, precipitation, decarburization. All of the principles of heat treatment, in fact, were formulated on the basis of the relationship which exists between the microstructures and the mechanical properties of steel.

For nearly 40 years, metallurgists have been using the constitution diagram and the control

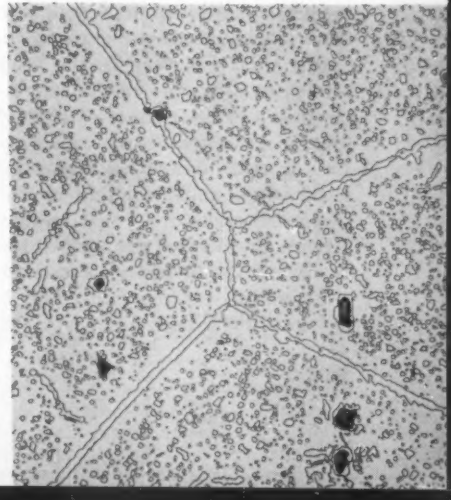


Fig. 1—Typical microstructure of nickel-base high-temperature alloy illustrates complexity, 500X.

Fig. 2A—Microstructure of quenched steel, consisting of feathery martensite, illustrates similarity to titanium structures, 500X.

Fig. 2B—Allotropic transformation in titanium alloy (above) has many of the features commonly associated with Fe-base alloys, 500X.

of structure primarily to document and control *processing*. This is all to the good—as far as it goes. But does it go far enough? Is this a fundamental approach or a simple manufacturing expedient?

In recent years, it appears that most of the emphasis is still given to the control of processing. From the manufacturing standpoint, this is altogether logical. Since the quality of the fabricated product depends upon its structure, it follows that this structure may be used as an indicator to guide control of processing operations.

Aim is economical production

Bear in mind that metal-forming equipment and metallurgical processes were—and to a large extent are—designed by mechanical engineers. Their aim? To make a given product most economically.

The limitations of this type of approach are considerable. They can be aptly illustrated by the development of two new fields of materials: superalloys and titanium.

During World War II, the need for super-alloys to operate at temperatures in the vicinity of 1500°F became pressing. It was not possible to develop new alloys on the basis of an understanding of the types of structures that would provide the desired properties. Instead, it was necessary to work in a range of compositions which previously had been successful, to vary the composition empirically over a promising range, and to process the resulting alloys by any available means.

Examination of the structures resulting from the process was used for control purposes only. Typical alloy families included Fe-Ni-Cr, Co-Ni-Cr-Fe, Ni-Cr, and Co-Ni-Cr. To these, various amounts and combinations of Mo, W, Cb, Ti, and Al were added. Nearly all of the current commercial alloys fall in these categories.

Most of the early work was done on a properties-processing basis. The microstructures were a maze of complexity. Fig. 1 is typical.

In many of the outstanding high-temperature alloys, it was known that grain size and the amount and distribution of precipitate were important. Still, very little was known about the constitution of these systems. Often, the crystal structure classification and the composition of important precipitated phases remained uncertain.

It is true that the empirical approach to the development of high-temperature alloys was ultimately successful. But this success was due primarily to the large volume of work done with these alloys.

Today, our metallurgical knowledge is constantly increasing. We know more about relating creep and rupture to grain boundary migration, particle hardening, structure stability, solution hardening, grain size, and other factors. The science that underlies good high-temperature alloys is becoming clearer. Application of this more specific knowledge should lead to markedly better alloys in a relatively short time.

Properties were promising

Titanium metal, you will remember, became available in large quantities late in the 1940's. Early tests showed that it had many interesting properties: light in weight, a higher melting point and higher strength than other light metals like aluminum, magnesium.

At the time titanium alloys first became important, many similarities to the behavior of steels were noted. A number of the constitution diagrams of titanium and other alloying elements, in particular carbon, nitrogen, and oxygen, were similar to corresponding diagrams for iron.

The allotropic transformation titanium from hexagonal-close-packed to body-centered-cubic had many of the features commonly associated with iron-base alloys. Similar martensitic structures in a quenched medium-carbon steel and in a titanium alloy are shown in Figs. 2a and 2b.

A useful basis for conducting research in titanium alloys has been provided by Gensamer, Gross-

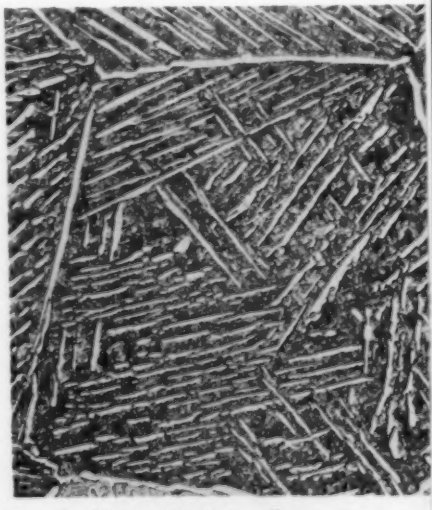


Fig. 3—Many titanium alloys are composed of a mixture of alpha and beta phases, 100X.

man, Bain and others on structures of hypoeutectoid and eutectoid steels and on the properties of steels having these properties. In addition, the principles of Hume-Rothery and Raynor were available for a critical trial.

As a result of this work, a number of good titanium-base alloys

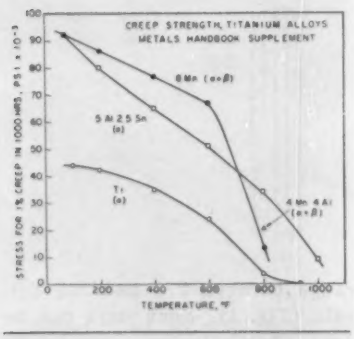


Fig. 4—At higher temperatures single-phase alloys show improvement over two-phase alloys.

were developed. From the beginning, it was noticed that there were some differences between the structure-property relationships for titanium alloys and for steels. There is still considerable work to be done in understanding these differences.

As soon as the use of titanium-base alloys at elevated temperatures became extensive, new problems arose. The first and most obvious of these is that titanium absorbs large amounts of contaminating gases such as oxygen and nitrogen from the atmosphere. The solution to reducing such contaminants is not yet complete.

For this reason, most titanium alloys are limited to use below 1000°F. The effect of hydrogen in causing notch brittleness is another important problem. A third problem is the lack of stability of the transformation products.

Many titanium alloys are composed of a mixture of alpha and beta phases. A typical microstructure is shown in Fig. 3. This is analogous to a steel which is half ferrite and half austenite. The whole development of good properties in steel has been based on avoiding this type of structure.

The use of two-allotropic-phase titanium alloys appears to be the result of processing requirements rather than a scientific approach to obtain the structures which are known to be strong. While good at room temperatures, the alloys undergo further transformation, accompanied by rapid deterioration of the mechanical properties at temperatures as low as 600° to 750°F. The phase instability at elevated temperature also leads to poor weldability.

New design approach taken

To eliminate this difficulty, an entirely new approach to alloy design was undertaken. It was known that certain alloying elements caused the transformation (which was responsible for the difficulty) to be raised to a high temperature. By adding these elements in sufficent quantity, it is possible to produce stable, single-phase alloys.

Some of these stable alloys are now beginning to appear on the market. The improved properties of single-phase alloys at higher temperatures as compared to two-phase alloys is shown in Fig. 4. It is now evident that much can be gained by a better knowledge of single-phase titanium alloys. In addition, significant strengthening of these alloys may be attained by the introduction of strengthening particles.

Titanium ternary alloys (those containing more than two elements in significant quantity) have not, as yet, been given much attention. However, as the binary alloys are improved, more effort can be shifted to the development of ternary alloys. The particle-hardened Ti-Si-Al alloy shown in Fig. 5 is an example of a possible approach to strengthening alloys.

It appears that the most promising future in developing new alloys with tailor-made properties is in utilizing our knowledge of what structures give the optimum properties and then developing the processing procedure around that structure. Foremost experience in this approach is the development of oriented soft magnetic materials.

Here, it was known that a certain structure in Fe-Si alloys would give desirable soft magnetic properties. A process was therefore designed to develop this structure. Another example of developing a processing procedure around a structure can be found in the austempering of steel.

Current knowledge has uncovered many relationships between structure and properties. Crystalline substructures appear to influence yield strength and creep rate. Grain size is related to yield strength and fracture stress.

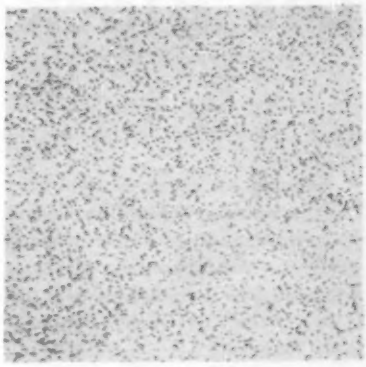


Fig. 5 — A possible approach to strengthening alloys is shown in this Ti-Si-Al alloy, 500X.

The distribution of impurities affects the extent to which metals become embrittled at low temperature and partially determines the extent to which a yield point will occur in a given metal. The particle size of second phases influences the amount of hardening developed by the particles. The spacing between second-phase particles has a significant effect on strength and fracture characteristics. Also, particle distribution can be used to control grain size and creep-initiated grain-boundary migration.

These are some ways that fast developing knowledge in various alloy types can be used directly to obtain desirable structures. Combining these technologies with pilot plant experience should produce new and useful alloys for today's and tomorrow's needs.

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Save hours of time—

Rugged Carbide Tools Speed Die Block Machining

◆ Hogging out chunks of steel from big die blocks is "rough" machining for certain . . . To do it quickly, many plants use bed-type milling machines equipped with carbide face mills . . . Even so, the right tooling makes a big difference.

◆ Here are helpful suggestions for tooling, speeds and feeds on typical die block face milling jobs . . . If you do this type of work, you'll want to match these recommendations against your own shop practices, and maybe modify accordingly.

F. W. LUCHT, Research Director, and T. KREUZER,
Service Engineer,
Goddard & Goddard Co., Detroit

◆ WHAT is the fastest, most economical way to machine large volumes of metal from big die blocks prior to die sinking operations? Many firms find the answer in the use of powerful, bed-type milling machines equipped with inserted-carbide face milling cutters.

But all of these companies do not apply the face-milling technique in the same way. As a result, some practices are more efficient than others.

Recognizing this, Detroit's Goddard & Goddard Co., producers of milling cutters, did some research on the problem. The firm talked to numerous customers and machine tool builders, and eventually came up with these suggestions for milling large die blocks most efficiently:

1. Use a bed-type milling machine with sufficient power and rigidity to take deep cuts at relatively high speeds and feeds.

2. Use a heavy, well-proportioned, angle-block type of fixture with simplified means for rapid set-up and positive clamping of die blocks.

3. Choose well-designed, heavy-duty types of face milling cutters for machining die block steel in the 300-430 Brinell hardness range. Cutter blades should be tipped with a tough, steel-cutting grade of carbide that can operate consistently at speeds of 125-150 fpm and feeds of 0.010-0.015 in. per tooth.

4. Regrind cutter blades as often as necessary and take care to produce unblemished cutting edges.

5. Plan all cuts carefully in advance of the actual job.

Based on the preceding recommendations, here are some actual examples of how typical face milling operations can be done efficiently.

The first job is usually to clean up scale and remove surface seams from chrome-nickel-moly die blocks whose hardness may range between 270 and 375 Brinell, (Fig. 1). Such work can be done effectively on a special 50 hp milling machine with a mechanical feed unit.

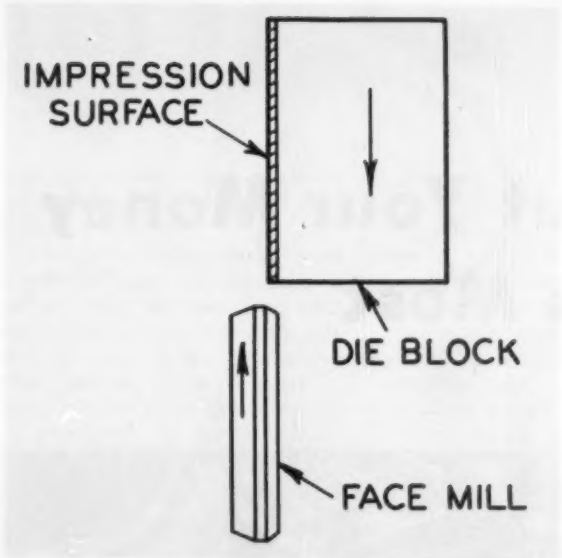
Recommended face mill for this job is a heavy-duty, inserted carbide type of 14-in. effective diam. It is of standard cone-type construction and has 14 blades, each with these characteristics: 5/8 in. x 35° corner angle with negative radial and axial rake angles.

One firm does this work at a speed of 147 fpm, using a feed of 8 ipm or 0.014 in. per tooth. Depth of cut varies between 3/16 in. and 9/16 in.; average cut width is 9 in. A wear land of 0.020-0.025 in. is considered normal dullness. Surface area milled per grind is 11,088 sq. in., or 790 sq. in. per tooth.

Blades cut deep

Another typical job (Fig. 2) is to rough mill the forming die impression in a 26x45x100-in. chrome-nickel-moly die block. Hardness of the block is 270-295 Brinell. The recommended face mill is an extra heavy duty, 12-in. effective diam type, using 14 carbide tipped inserted blades capable of taking cuts 1 in. deep. Blades are set at double negative radial and axial rake angles, and are ground at a 30° peripheral cutting edge angle.

This job is done successfully on a 60-hp planer type milling ma-



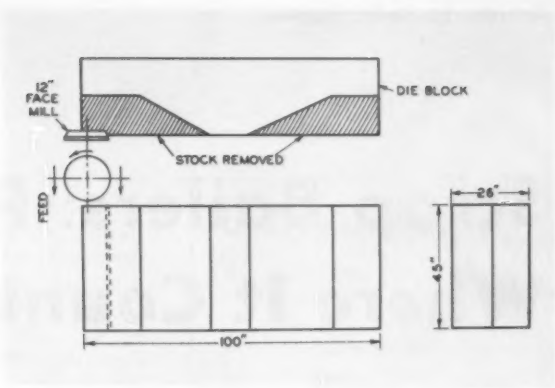


FIG. 1—(Left) FIRST face milling operation on a large die block usually removes surface scale and seams.

FIG. 2—(Above) A 12-in. diam cutter with inserted, carbide-tipped teeth removes this excess stock in 8 hours.

chine, using vertical head feed due to the size of the die block. The speed and feed combination is 126 fpm and 0.0125 in. per tooth (7 ipm). A total of 25 cuts, each 45-in. long, mills one side of the die completely. Five of the cuts are 0.5 in. deep by 9 in. wide; the other 20 are 0.75 in. deep by 8 in. wide. Full use of the machine's 60 hp-capacity does the work in 8 hours.

Mill large areas

The surface area milled per cutter grind is 8625 sq. in. total, or 620 sq. in. per blade. Normal wear-land width is 0.020-0.025 in. along the peripheral cutting edge angle and the corner. Metal is removed at the rate of 0.8 cu. in. per minute per hp.

For another typical operation refer to Fig. 3. Here the matching side and end of a die block are face milled, after which the shank is roughed out to a depth of 3 in. Size of the block is 15 x 29 x 33 in.; its Brinell hardness is approximately 330.

A heavy-duty, 14-blade, inserted carbide face mill of cone-type construction with a 10-in. effective diam is used here. The blade characteristics are: ½ in. x 30° corner angle, with negative radial and positive axial rake angles.

Milling the side and the end of the block with a 75-hp machine will permit cuts from 3/16 to ½ in. deep and from 6 to 8 in. wide. Suggested speed is 140 fpm and feed is 5½ to 8 ipm, or 0.007 to 0.010 in. per tooth.

The shank is roughed out with successive cuts ½ to 1 in. deep and from 6 to 8 in. wide. Speed and feeds are the same as those used for end and side milling.

The final operation of finish milling the die block shank shown in Fig. 3 requires carbide tipped inserted blades in a 5° angular face mill of 10-in. diam. All 12 blades are set at negative radial and positive axial rake angles.

First operation here is a light cut on the top of the shank. The cutter is then positioned to mill the wing face and the 5° locking angle at the top and bottom. Cutting speed is 141 fpm and feed is 5½ ipm, or 0.0084 in. per tooth. The cutter will make from 24 to 30 cuts, each 33 in. long, between grinds. Normal wear land is from 0.015 to 0.020 in. wide.

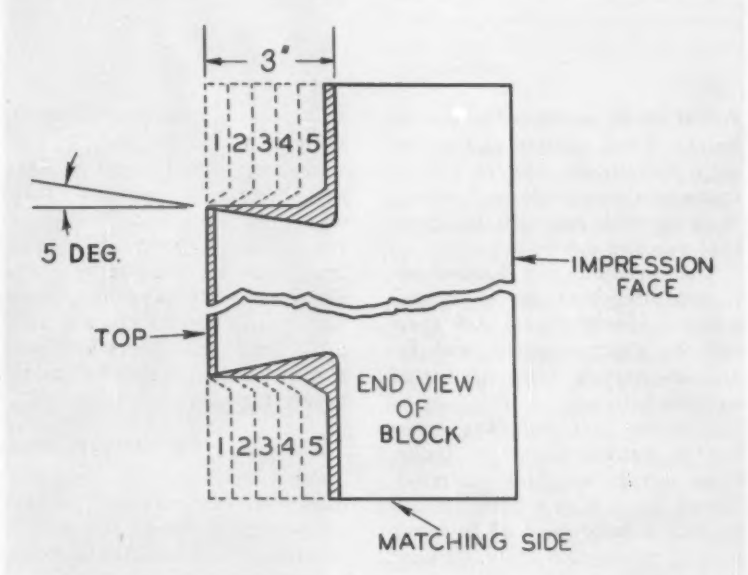


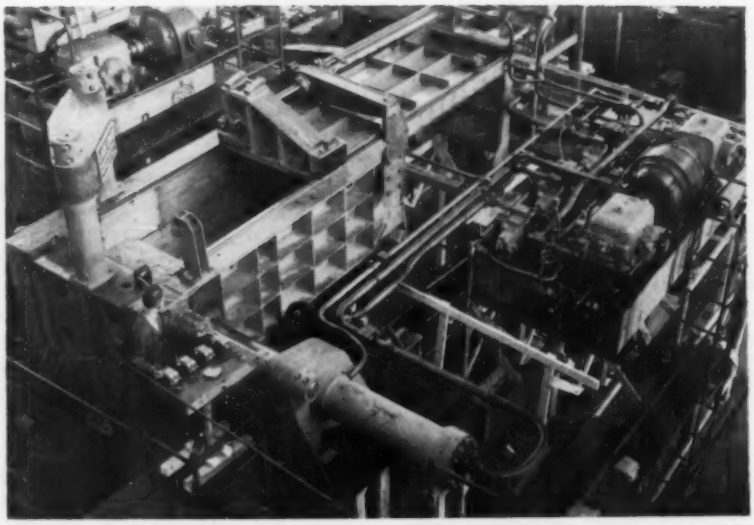
FIG. 3—END, matching side and shank of this large block are rough milled in one setup; shank is finished in second setup.

Scrap Bailers: Put Your Money Where It Counts Most

◆ The variety of scrap baling equipment to choose from both solves and creates problems . . . First, it virtually assures that somewhere there's just the baler you need . . . But the large selection does complicate picking the right one.

◆ One approach calls for setting up your own specifications, then looking the field over to find that one baler most closely matching your needs . . . Here are some pointers to simplify the job.

By J. E. HYLER, Consultant, Peoria, Ill.



TRIPLE-COMPRESSION machine turns out 35 to 40 1000-lb bales hourly, each 16 x 20 x 20 in.

◆ WHAT do you want in a scrap baler? First, equipment that fits your pocketbook. Second, a baler that meets your needs most closely. With the wide selection, it's likely that you can get both.

The question-and-answer approach offers one way to compile a list of specifications. Ask yourself the right questions, and the answers narrow down the list of suitable balers.

Consider first the floor space lost to manufacturing by bulky, loose scrap awaiting disposal. Where space is at a premium, installing a baler pays off in lower over-all production costs. Higher production results from more space being devoted to manufacturing. This can more than offset baling costs, including the initial investment.

Second, examine your current scrap handling costs. If baled, will scrap move faster, easier and require less manpower? A switch from loose to baled scrap almost always pays its own way. Similar savings can also be chalked up in direct production operations, such as scrap charging time of an open hearth furnace.

Answer your needs

Other questions will help your baler selection problems: (1) Does your operation lend itself more to portable or to foundation-mounted baling equipment? (2) Do you need high or low compression balers? (3) How about scrap loading: directly or through a hopper? (4) Is there sufficient volume of scrap to justify automatic equipment? (5) Is baling speed a factor: maybe a double pump is indicated to speed the compression process.

Also, (6) Must the bale be compressed in three dimensions, for maximum density, or will double compression suffice? (7) Do the advantages of interlocked weighing-baling equipment justify themselves for you? (8) What kind of scrap do you produce: chips, stringy masses, press clippings or skeletons? (9) Will you be pressing hard or soft scrap? (10) Do you have any preference in scrap bundle sizes?

Each question, and others like

them, represents a choice between two or more designs available in baling equipment.

Different machines make bales of different sizes. Occasionally, a machine can be located so that baled scrap is chuted directly into railway cars. Some balers can press several different sizes of bales, depending on the scrap being processed. At times, a scale interlocks with the baler to weigh scrap as it enters the box.

Conserves space

A big advantage in using a scrap baler stems from the considerable floor space it saves. The machine itself occupies little space. It's obvious that storage and shipping space for baled materials is small compared with loose scrap.

Plants often find that floor space saved by baling can be used to good advantage. This applies particularly where floor space charges are high, or where there's a shortage of space.

Certain baling machines are particularly designed for handling nonferrous metals, including tough, heat-treated aluminum scrap. These portable, hydraulic units operate rapidly. Some can compress and return to filling position in 45 seconds. Although portable, they can nonetheless be installed in a pit if desired.

One baling press produces a bale of 10 by 18 in. cross section, varying in length from 10 to 14 in. This baler handles all classes of sheet metal scrap, including heavy punch skeletons, trimmings, and wire, in addition to soft metals of every description.

Triple-compression baling machines produce scrap bales of the greatest density. Some are designed for baling lighter materials, including light steel scrap, tin cans, and nonferrous metals. A typical press of this type turns out bales 10 in. square, and 10 to 14 in. long. A high torque motor operates the unit.

In plants handling and baling bulky scrap in large volume a press with a sufficiently large box is important. This can eliminate or greatly reduce the work of preparing scrap for baling.

Some triple-compression baling presses will handle large pieces at high tonnages. This with little or no preliminary sawing, shearing torching or manipulation in loading and baling. They can take oversize pieces and quickly compress them into heavy, high density bundles.

Check these points—

- Portable or foundation-mounted ?
- Preferred bale size ?
- Automatic or manual operation ?
- Hopper or direct feed ?
- Operating space available ?
- Double or triple compression ?
- Type of scrap ?
- Volume of scrap ?
- What's your price range ?

TOTE box carries scrap, dumps directly into compression baler without further handling. Baling operator controls tilt-over action.

Compress three ways

Triple-compression scrap presses built by some firms combine three simple hydraulic units operating successively in a single rigid box. Box distortion is negligible, even under heavy baling stresses. An air-operated box cover is employed.

After the press box fills with scrap, the cover closes over the charge and locks down tightly by wedges at front and back. A preliminary or gathering ram then moves hydraulically through the box's long axis, compressing the contents into a block at the forward end. Next, a secondary hydraulic ram plunges in from the sides. Finally, a vertical ram moves up in last compression.

High press speeds call for twin pumps . . . Such a setup permits operating the press at reduced speeds on one pump while the other is repaired . . . think about closed circuit television, too . . .

On withdrawing the cover, the bale is ejected. As the cover closes automatically over the next charge, it shifts the completed bale to a conveyor or chute for removal to railroad siding or other disposal point.

Compressed air pullbacks retract the horizontal rams. These function as hydraulic pressure drops on the rams. A quick return valve under the cylinder of the vertical ram clears the fluid, and allows it to bottom rapidly by gravity.

In some presses the box is directly loaded. But if desired, an auxiliary loading hopper is feasible. The hopper prepares a charge of scrap while the press bales. This charge drops quickly into the press box on removing the cover.

One such hopper pivots on the side of the baling press. It operates by compressed air controlled by a valve at the operator's stand. All or part of the charge is dumped, as expedient.

Operation on such presses is controlled by balanced poppet-type valves. These work either by compressed air through hand valves, by hydraulic pressure, or manually. A spring-loaded shock absorber protects the press against pressure surges.

Such presses, generally controlled manually, sometimes warrant automatic operation. An electric control system can put the press through its motions.

Can work automatically

The only manual work then is pushing a button to start box cover movement. Operation proceeds automatically, and the baler comes to rest with its cover retracted, and with the compressed bale held in elevated position by the vertical ram. An optional bank of hand levers permits switching to manual operation at any time.

Extremely high press speeds may call for a double hydraulic pump arrangement. Such a press setup can operate at reduced speed on a single pump while the other undergoes maintenance. Shut-off valves isolate either pump as necessary. Where two large pumps are used together, a bypass valve reduces ram speeds at the extreme end of the stroke to avoid excessive slamming.

Presses of similar design also can work with two compressions instead of three. There, one horizontal gathering ram moves through the long axis of the baling box. On completion of this motion, the vertical ram moves upward, compressing the bale against the cover. The cover is then withdrawn and the bale elevated for ejection.

Move baler to scrap

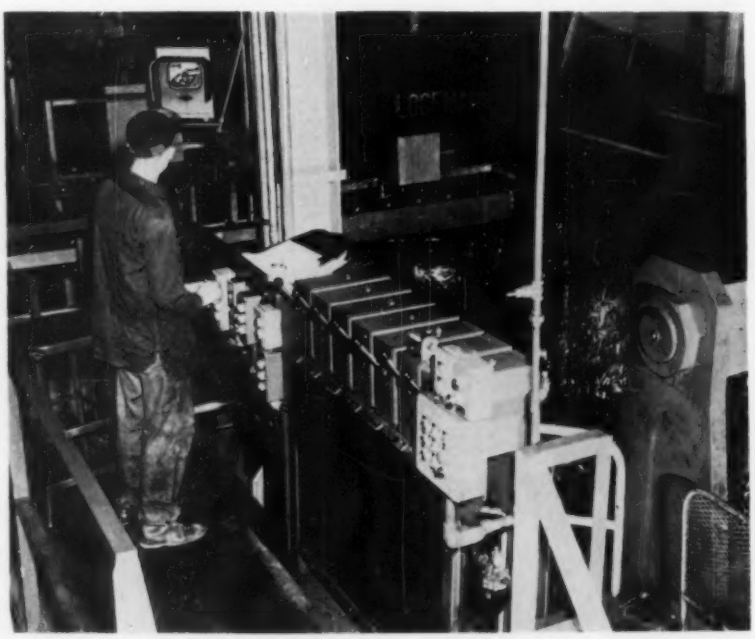
Where large tonnages of scrap are scattered over a wide area, an easily transported scrap baler helps. One such press is built on a heavy steel skid frame on which necessary pumps, valves, internal-combustion engine, tanks and piping, are mounted. No pit or foundation is required with this arrangement.

Can work electrically

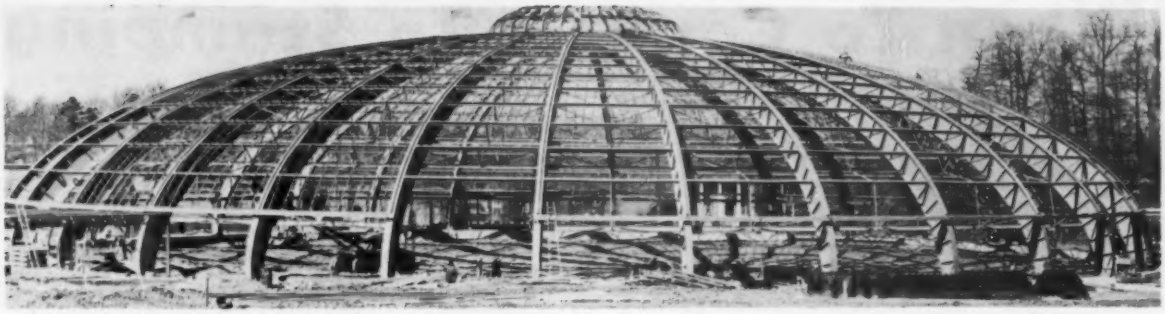
With this portable baler, an electric motor drive can replace the internal combustion engine. The box cover clamps tightly by steel wedges. It operates so no hydraulic air compressor is required.

To round out your scrap baling picture, think about accessories and auxiliary equipment that can make the job easier or reduce its costs. Closed circuit television, to cite one example, has paid off for a number of metalworkers baling substantial volumes of scrap.

The installation (shown below) at the Ford Motor Co. Buffalo plant clarifies this. One man both bales scrap and controls loading of the 300 to 425 bales required to fill the average railway gondola car. Each bale weighs 300 lb or more.



DUAL-PUMP, triple compression baler is controlled by pushbuttons. TV screen shows chute exit.



NOTE WORKMEN at upper right on all-welded stadium shell network.

Welded Umbrella Supports Stadium Shell

◆ KNOTTY problems in steel fabrication and erection confronted Calvert Iron Works, Atlanta, in building a self-supporting stadium shell for Georgia Institute of Technology. First was the fabrication of 32 massive steel beams, each cambered more than 50 ft out of true along its 141½ ft length. Then came the matter of erecting the framework, an umbrella-like shape later welded into a single, rigid 550-ton assembly.

The shell measures 270 ft diam, and stands 51½ ft above ground level at its center. The depressed arena within is unobstructed by columns or other supporting structures.

Center ring supports ribs

Key member of the entire steel network is a 10½ ft diam top center ring or lantern girder weighing almost 20,000 lb. To this, 32 arching ribs are first bolted, then welded. Ribs connect at their lower end to the grade beam through 3¾ in. steel hinge pins, held by four anchor bolts in the circular reinforced concrete footing.

Ring flange plates are 2¼ in. steel, cut on a radius of 16 in. width. The 1½ in. thick circular ring web joins the flange plates and also carries the vertical plates to which the ribs are welded.

Shop-fabricated in two sections, ribs were fitted up in supporting vertical jigs. These jigs tied down the bottom flange at both ends after prebending to desired curvature.

Webs of 5/16 and ⅜ in. steel plate vary from 3 ft wide at the stadium's foundation and crown to 4½ ft wide between those points. Flanges 16 in. wide by ¾ in thick join these webs through continuous ¼ in. fillet welds, made with high-speed iron powder - coated electrodes. Bulbed T-sections 5 in. wide and spaced at 4-ft intervals stiffen each rib.

Shop welding on each rib required 275 lb of electrode for the 800 ft beam, and about 48 manhr. The Lincoln Electric Co., Cleveland, supplied electrodes and welding equipment both for shop and field fabrication. After bolting the rib sections together in the field, they were arc welded, using E-6010 electrodes. Bolts then were removed.

A temporary, fabricated steel column was erected at the exact center of the stadium site. The lantern girder was hoisted up and bolted to the vertical beam's crossarms. Two ribs were fitted with connecting trusses and purlains, then attached to the hinge pins in the foundation. A crane then lifted the upper ends of the two girders to the fastening plate on the lantern girder.

A diametrically opposed rib pair was similarly raised, followed by two more pairs at right angles to the first set. This sequence was repeated for each of the 16 double-girder units. After preliminary bolting at the center ring, joints were welded.

Supports taken out

As work approached completion, the tie-down bolts between the lantern girder and the crossarms were removed. In the heat of the day, the ring lifted about ¼ in. free of all support, and became free-standing, as designed. The vertical steel column at the stadium's center was removed after welding the network into a rigid structure.

OPPOSED girder pairs are first bolted, then welded to center ring.

When To Convert To Stamping

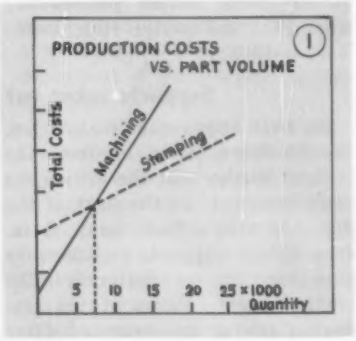
◆ To stamp or not to stamp is the puzzle . . . Maybe casting, forging or machining a particular part will cost less . . . But where is this the case? . . . Where will stamping save money, improve the production rate?

◆ These tips will help determine which parts lend themselves to conversion for stamping . . . Base your decision on part function, not outward appearance . . . Typical examples of redesign explain this.

By FEDERICO STRASSER, Consultant, Santiago, Chile

◆ STAMPING can sometimes replace casting, forging, machining or assembly of components as a production method. Obviously, the reverse holds true also.

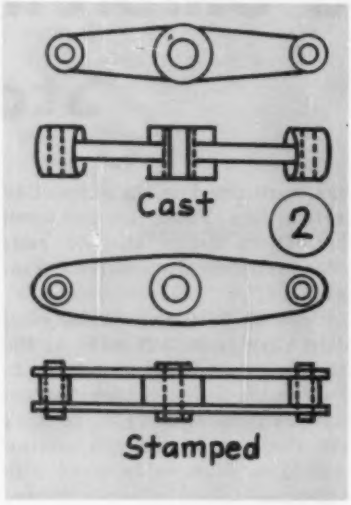
But your object here is to discover whether converting a particular workpiece to stamping will (1) Decrease your costs per part, (2) Boost your rate of production, or (3) Result in a better, stronger



or lighter part than at present. A switch to stamping has done this for some parts, even complex ones.

Such an evaluation will answer many questions, including (1) Basically, what are the part's functions? (2) Can the part do its work equally well when redesigned as one or more sheet or plate components? (3) Can redesign for stamping justify itself in economy or improved efficiency?

The answers may be "yes." But deciding the part *can* be stamped doesn't automatically mean it *should* be stamped. Look into comparative costs first. The well known break-even graph helps here.



By plotting all costs for a given manufacturing process along one axis, and part volume along the other, derive your costs per part at the expected production rate. Fig. 1 illustrates an example where stamping wins out over machining with output beyond 7500 parts. Other charts covering forging and machining of the same part might show up stamping in a different light.

But such charts don't necessarily tell the full story. Some cost factors are difficult to graph. Cases exist where stamping or another process will prove economical even below the graph's break-even point.

Consider an example of this. Rolled or pressed material is stronger than cast or machined metal in properly designed parts. These parts can be lightened, thus saving material and its cost.

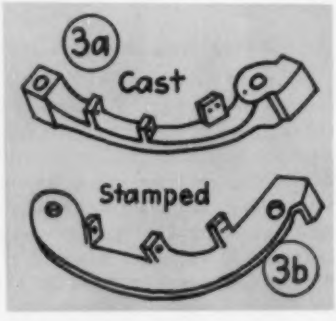
Converting from a casting to a stamping may call for imagination, as well as keen knowledge of how the part functions.

It's relatively easy to conceive the redesign that altered the cast two-arm lever of Fig. 2a into the stamping of Fig. 2b. But at first glance, the two bushing holes and cast lugs of Fig. 3a may seem beyond the possibilities of stamping. Yet the stamped part (Fig. 3b) functions just as the cast component does.

Often a number of alternate designs present themselves. Selection then depends not only on relative costs, but also on which process best suits your shop.

Fig. 4a shows a common clevis as cast. In Fig. 4b, the end lug is sheared from flat strip, then welded to a yoke milled from solid stock. Fig. 4c is built up from three identical pieces of flat sheet, first sheared and pierced on a progressive die, then welded. Fig. 4d resembles Fig. 4b, save that the yoke is bent from flat stock.

The spotwelded construction of Fig. 4e calls only for blanking and simple bending on the press. Fig. 4f achieves the same result, but by multiple forming of a single piece of flat stock. Perhaps the most economical design, both in tooling and labor costs, is Fig. 4g.



A cast foot treadle didn't always stand up under rough handling. Its stamped counterpart (Fig. 5), welded from formed channel with a blanked, checkered floor plate, gives better service.

Fig. 6a shows a large cast lever

that performed well, but proved costly to make. Redesigned as a welded assembly of two square-sheared blanks (Figs. 6b and 6c), it uses less metal. Dies and other tooling are completely eliminated, except for an inexpensive welding fixture. See Fig. 6d.

A cast double bracket (Fig. 7a) is easily converted to a stamping that costs less. A short piece of tubing welded into the formed stamping supplies the necessary bushings (Fig. 7b).

Converting forgings to stampings frequently involves press-work on two or more sheet metal components. Thus the difficult forging of Fig. 8a converts to the blanked, bent and riveted assembly of Fig. 8b.

In redesigning from a forging, don't hinder yourself by insisting on the original part contours, if they serve no useful purpose. Fig. 9a was produced earlier by forging and drilling. In converting to a stamping from strip stock, it became obvious that retaining the original part contours would waste much material. So the form was altered to that of Fig. 9b. Note the unchanged positions of the holes in Figs. 9a and 9b.

Draw shells to save

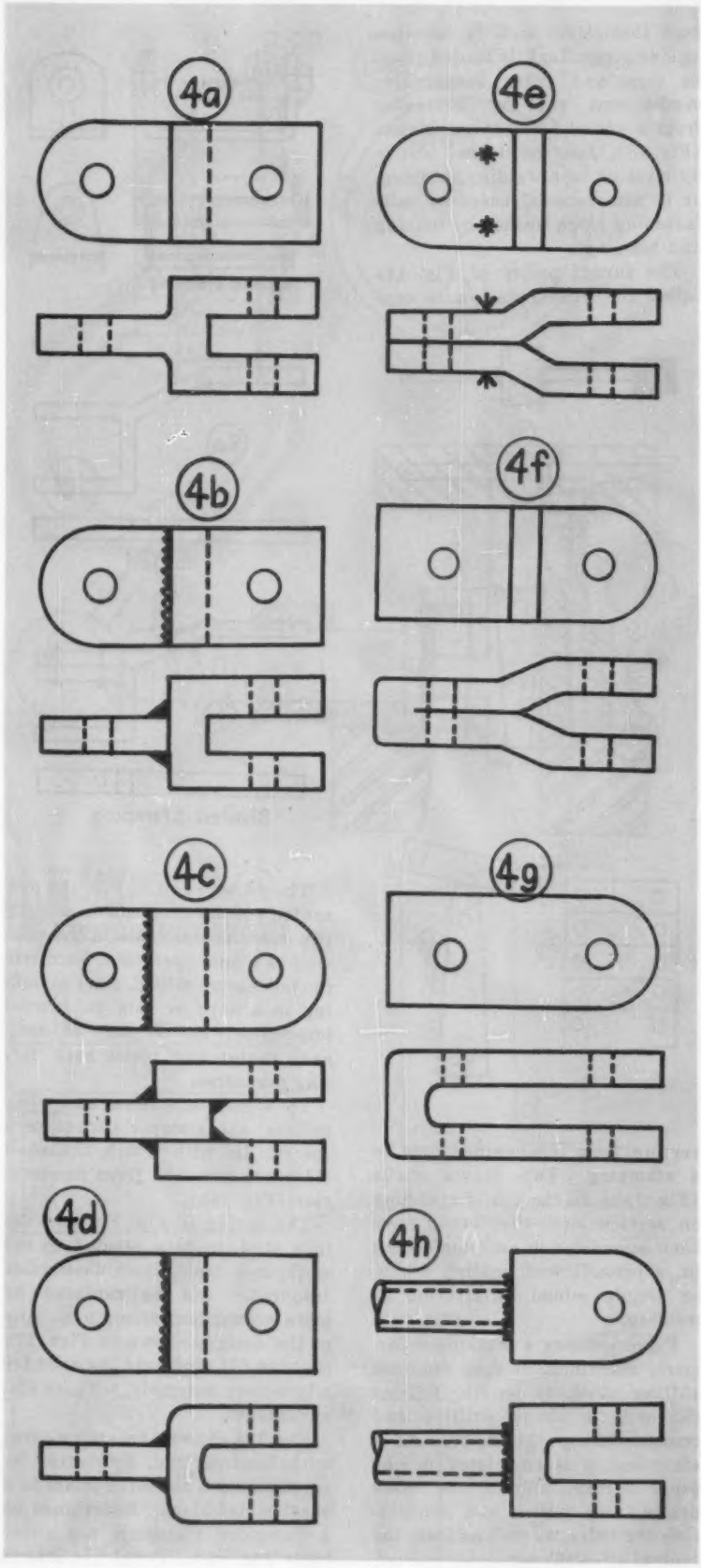
Drawn shells at times will replace machined parts at lower cost. Hollow shells turned from solid stock waste much metal, clearly seen in Fig. 10a. The same part, drawn as in Fig. 10b, not only makes better use of material, but also cuts labor costs.

Such hollow drawn shells can also effectively replace dowel pins, rivets, short axles and other similar parts.

Sometimes blanking plus a simple bending operation will result in a stamping successfully replacing a costly machining. Figs. 11a and 11b. Pierced ears turned up as shown in Fig. 11b provide the axle bushing necessary.

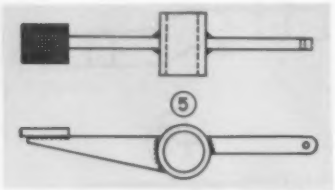
In Fig. 12a, the one-piece part was machined from solid bar-stock. Redesigned as a round bar and stamped washer assembly (Fig. 12b and 12c), the press-fitted part uses only one-sixth the metal formerly needed. Labor costs dropped almost 80 pct.

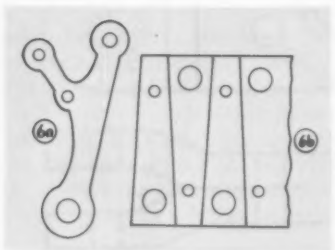
Even machined gears sometimes



lend themselves well to redesign as stampings. Lightly loaded gears in toys and other inexpensive mechanisms can be laminated from a series of identical blanks (Fig. 13). Join the stacked blanks by riveting, spotwelding, brazing, or in some special cases by self-fastening lobes formed by lancing and bending.

The turned pulley of Fig. 14a called for little redesign in converting from a machined part to a stamping. Two drawn shells (Fig. 14b) do the job. Depending on service load, they could have been assembled in an interference fit, a pressfit with mating beads, or simply joined by riveting or welding.





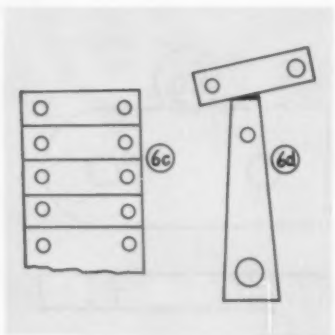
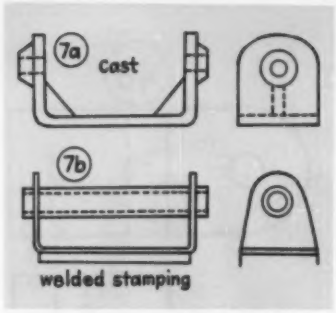
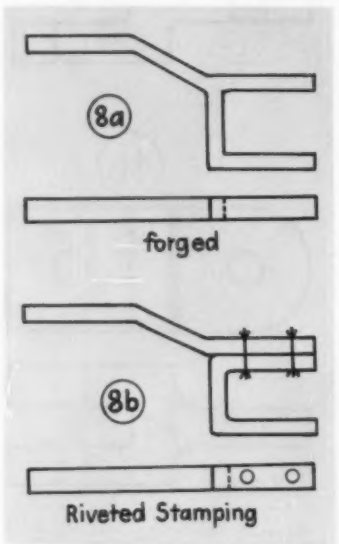


Fig. 15 shows a workpiece formerly machined. It then required cutting stock to length, milling the ends to shape, drilling and countersinking the holes. As a stamping, it is completed in one press stroke. While the shell draws, dies punch and countersink the holes, as well as form the central rib stiffener.





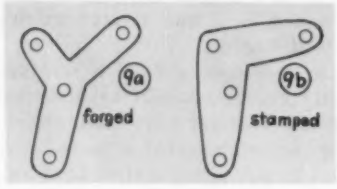
The drawn shell of Fig. 16a presented special problems in cutting two semicircular holes in the sidewall as a final operation. Formerly the holes were milled, since punching in a horn or cam die proved impossible. No dieplate of ordinary design can resist such cutting pressures.

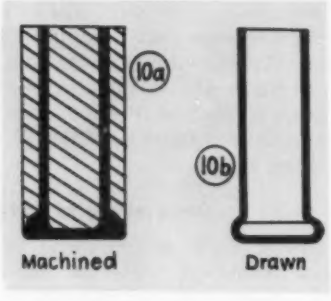
To avoid expensive and slow milling, the stamper turned to a special die with which the shell sides are punched from the interior (Fig. 16b).

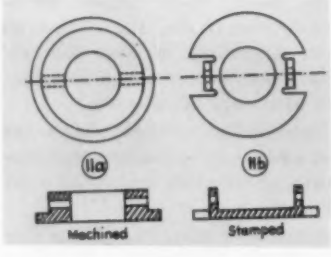
The spring in Fig. 17a attaches to a stud, in turn riveted to the workpiece itself. Such assemblies frequently can be replaced by more economical stampings. Any of the designs shown in Figs. 17b through 17f eliminate the need for a two-piece assembly, with its disadvantages.

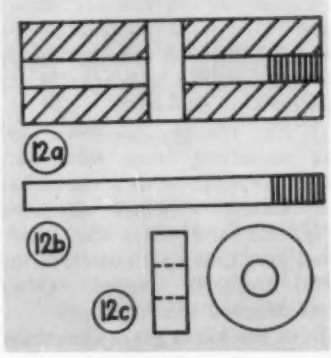
Fig. 18a shows a two-piece cover with locating rim, fabricated by spotwelding a milled channel to a sheet metal blank. Redesigned as a one-piece stamping, the cover costs far less. Two lugs, lanced and bent parallel to the bent edge, do the same job, as shown in Fig. 18b.

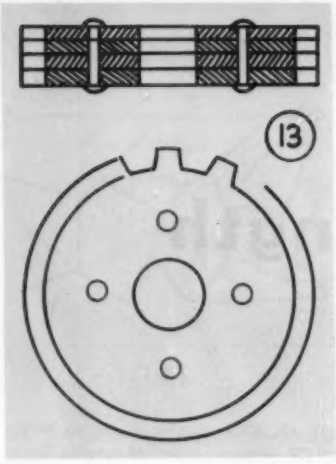
These examples have only one function: to emphasize that cases exist where stamping can do a job more easily, at less cost, than other production methods. But remember the other side of the coin as well. There are designs, and many of them, where to stamp would be debatable, if not outright foolish. So temper your decision with knowledge of the conditions and equipment in your own shop. These redesign pointers will help you in making a decision.

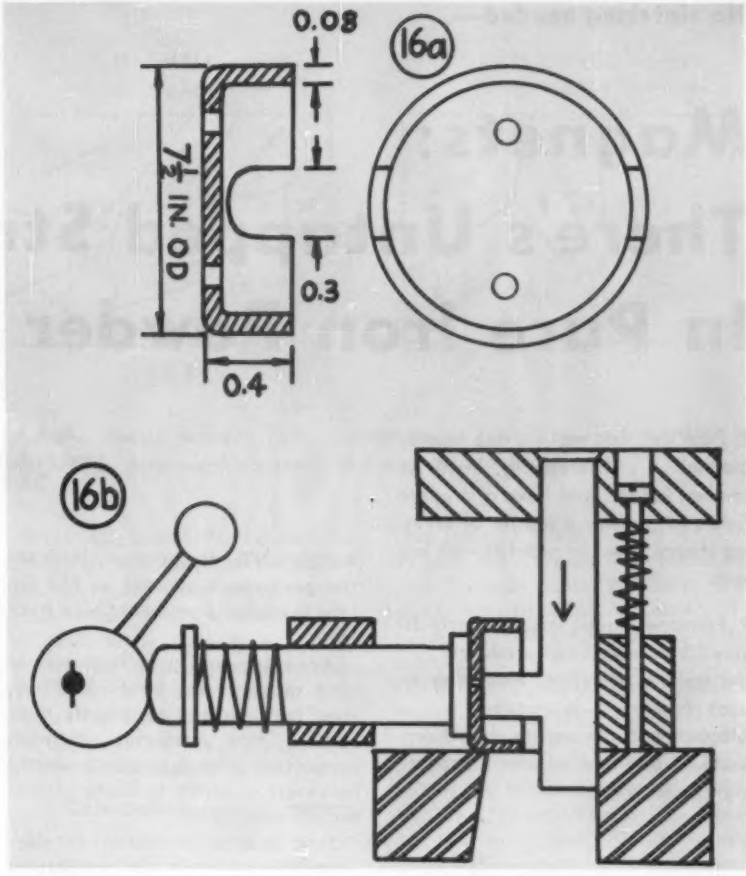


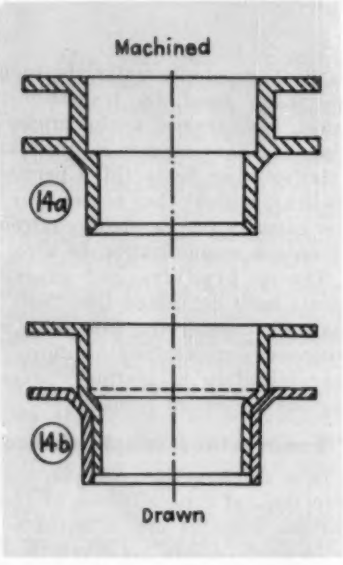


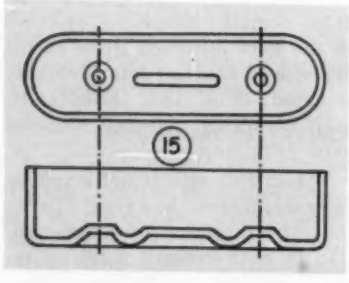


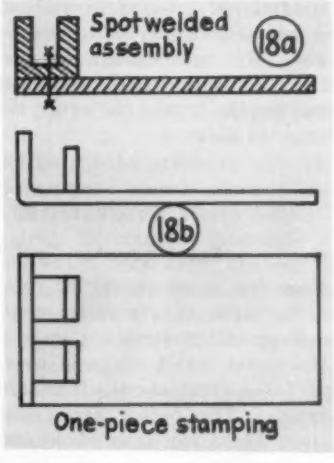


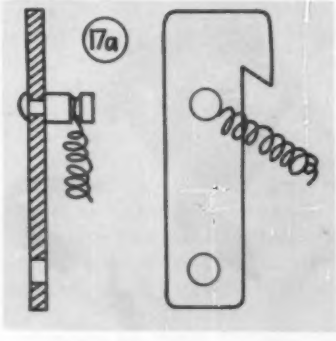












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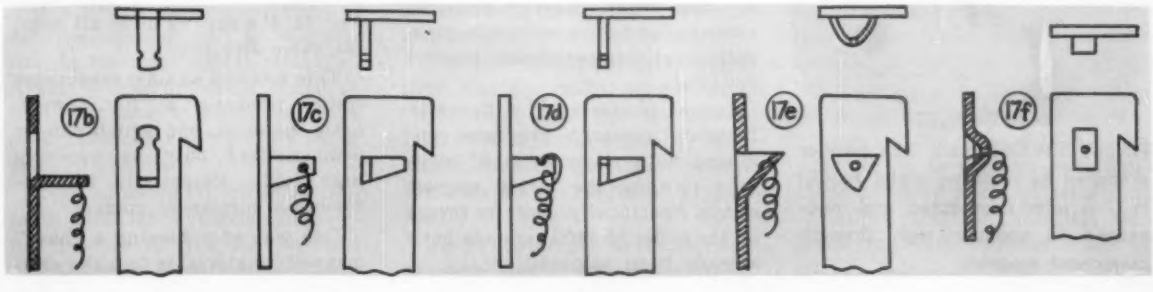


No sintering needed—

Magnets: There's Untapped Strength In Pure Iron Powder

◆ Pure iron can make a top quality magnet . . . Theoretically, it will be smaller, lighter, and have a stronger field . . . It's now a matter of bringing theory down to practice—at low cost.

◆ Permanent magnets of finely-divided iron have been produced . . . No melting, sintering, machining or heat treatment is required . . . Magnets can preform to close tolerances in standard powder compacting equipment.

By F. E. JAUMOT, JR., Chief, Physics of Metals Section, and A. E. BERKOWITZ, Group Leader, Magnetics Group, The Franklin Institute Laboratories, Philadelphia, Pa.

◆ RECENT discoveries indicate the permanent magnet of the future is likely to be essentially pure iron.

Advantages of pure iron permanent magnets are twofold. First, iron is a cheap, abundant, noncritical raw material. Second, properties of such magnets should be vastly superior to those of materials now used.

Just how much better is suggested by a look at two properties considered significant in evaluating magnetic materials: coercive force (H_c) and energy product (BH_{max}). With both, generally speaking, the higher the value, the better the magnet.

Energy products of 40 million with coercive forces ranging up to 10,000 oersteds seem feasible.

FINELY DIVIDED pure iron powder prepared by reducing alpha $Fe_2O_3 \cdot H_2O$ is later compacted and magnetized to produce high strength permanent magnets.

Exert greater "pull"

Consider these values in relation to those of generally available magnetic materials. Commercial magnet steels range in coercive force from about 40 to 170 oersteds. The better permanent magnet alloys run from about 500 to 1400 oersteds, and a bit higher in some cases. Energy products average one to five million in presently available permanent magnet materials.

Initial phases of the Franklin Institute research program concluded with preparation of magnets rivaling the better magnet alloys. Specifically, coercive forces on the order of 1400 oersteds have already been achieved.

"Soft" magnetic materials, such as those used in transformer cores, have several useful properties: (1) They seem to saturate in relatively low fields (high permeability), and (2) they possess very low coercive forces (field required to reduce magnetization to zero).

Theory predicts and experiments have confirmed that "soft" magnetic materials are always composed of regions uniformly magnetized to saturation. These regions are called domains.

Demagnetized sample studied

In a demagnetized sample, the directions of magnetization of the various domains are oriented so as to produce zero net magnetization (Fig. 1a). On applying a weak field, domains favorably oriented to the field direction grow at the expense of domains less favorably oriented (Fig. 1b). Eventually, only favorably oriented domains exist (Fig. 1c).

The sample still is not magnetically saturated, however. To do this, the direction of magnetization in each domain must be rotated, against crystalline forces, into the field direction. That is, in Fig. 1c, the arrows must all point the same direction.

This rotation against crystalline forces produces a "hard" magnetic material, one which can be demagnetized only by applying high fields. Essentially, this describes a permanent magnet.

One way of achieving a "hard" magnetic material is to make exis-

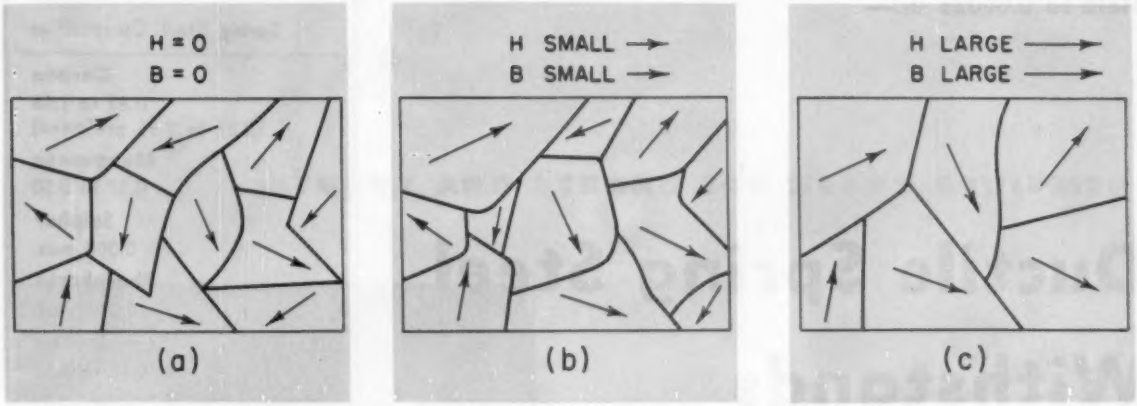


FIG. 1—Drawings explain temporary magnetism. Eleven domains (left) dwindle to six (right) as electromagnet is created; reversing the field destroys the magnet. In permanent magnets, the process is detrimental.

tence of a "soft" magnetic material impossible. This can be done simply by producing a material in which domain walls cannot exist.

As the dimensions of a ferromagnetic specimen shrink, a critical size is reached. Below this point, it's no longer energetically favorable for a domain wall to exist. A particle in this size range contains only one domain, hence is known as a single domain particle.

The critical size for iron particles is on the order of a few hundred angstroms (the 0.000002 in. range). In this size range, the particle can be uniformly magnetized to saturation.

The magnetization of a single domain particle can be changed only by a high energy rotation process. It is in fact a very small permanent magnet. An assembly of such particles will have permanent magnet properties.

Magnetization Factors

If an applied field is not present, the direction of magnetization of a single domain particle is determined by one or more of several factors. Shape anisotropy is one such factor.

If a single domain particle is needle-shaped, it will be magnetized in its longitudinal direction. A single domain needle shape of iron can have a maximum value of $2\pi \times 1700$ oersteds, or about 10,500 oersteds.

How an assembly of single domain particles responds as a magnet depends on how the particles are aligned.

That alignment is related to crystalline structure of the material. In each magnetic material exist certain crystallographic directions along which a single crystal can be magnetized to saturation by a smaller field than is required in other directions. These are the so-called "easy" directions of magnetization.

Orientation affects forces

If the single domain particles are aligned in the "easy" direction, then the coercive force of the assembled particles in the direction of alignment will equal that of an individual particle. If the particles are randomly oriented, then coercive forces will be reduced approximately one half.

The particles are essentially minute permanent magnets, so they attract each other very strongly. This action can reduce the magnetic properties of the particle assembly below those of the isolated particles.

Special techniques must be employed to achieve satisfactory dispersion. Among these techniques are (1) coating particles with a nonmagnetic layer, and (2) special magnetic dispersal methods.

The presence of particles larger than single domain introduces a "soft" component into the assembly. Particles much smaller than single domain size also change the assembly's magnetic properties.

Three principal methods can produce single domain particles. One method, mainly used by the French, involves decomposition of iron formate salts. Another, now under investigation, creates particles by electrodeposition into mercury.

The third, practiced at Franklin Institute Laboratories, uses standard wet chemical techniques to prepare alpha, beta or gamma iron oxides in either hydrated or dehydrated form. The oxides then are reduced to produce the desired pure iron particles.

This last process is a cheap method readily adapted to large scale production.

A special handling problem shows up with single domain particles. The small particle size encourages rapid oxidation. This can lead to spontaneous ignition in much the same manner as white phosphorus flames on exposure to air. Immersion in benzene or a similar organic solvent controls this pyrophoric tendency.

Magnets are produced by compacting the powder in dies under 10,000 to 200,000 psi. No sintering, melting, casting, machining or heat treatment is needed. Aging techniques are under investigation. Lack of a sintering operation means very close tolerances may be held in the compact shape.

Binders may be mixed with the powdered iron to increase the mechanical strength of the final product, or to prevent oxidation. Many binders prove satisfactory, including acetates, acrylics, styrenes and various other kinds of plastics.

Held to 0.00025 in.—

Ductile Spring Steel Withstands Severe Forming

◆ SPECIAL SPRING STEEL for automotive piston rings, cold rolled to ±0.00025 in., is meeting rigid manufacturing and service needs. Quality of the high carbon steel is such that it withstands severe cold forming, yet after heat treatment possesses great elasticity.

Thompson Products, Inc., St. Louis, uses the steel to produce two types of flexible all-steel oil-control piston rings. One type, 4¾ in. diam, is made in a single piece as 68 equally spaced and continuously joined individual steel springs. The other is similar in design, but combines expander and spacer ring functions into one unit.

The special cold-rolled steel was developed for Thompson Products by Wallace Barnes Steel Div., Associated Spring Corp., Bristol, Conn. Formed into piston rings, the steel (1) Strongly resists wear, (2) allows the ring to closely conform to tapered and out-of-round bores, even when moving at high speed, (3) Does this while maintaining relatively constant pressure both axially and radially, and (4) Holds the pressure with little change throughout spring life.

Table I lists composition of the steel determined suitable after a wide range of tests.

As-received hardness of the steel is R30-T 67 to 73. It must be completely spheroidized, preferably with intermediate size spheroids. Tensile strength must range from 75,000 to 82,000 psi, with no less than 25 pct elongation in 2 in.

The intricate forming operation necessary in piston ring manufacture means rigid inspection is essential. The material must be bent into a U-shape in a special die. Any sign of cracking causes rejection of the stock, except those cracks appearing at the end of the test specimen and resulting from burrs left in cutting.

Decarburization of the steel does not exceed 0.0005 in. deep. Thus when the steel oil-quenches in a neutral bath at 1500° ±10°F, minimum surface hardness is R15-N 93.

Newness of the piston ring design made special production facilities necessary. Fully automatic machinery has been developed capable of mass producing the rings on progressive die set-up at 4000 hourly. All this at reasonable cost.

Spring Steel Composition

Carbon	0.87 to 1.05 (0.87 to 0.95 preferred)
Manganese	0.30 to 0.50
Sulphur	0.050 max.
Phosphorus	0.040 max.
Silicon	0.15 to 0.30

Retains spring pressure

Ring wear affects spring tension in the piston ring less than those needing inner springs, shims or expanders. Higher piston speeds and engine loads are claimed possible, since the light weight spring-type ring has low inertia.

Variations in ring groove depth are said not to affect wall pressure of the ring. This because the ring depends for its tension not on the bottom of the ring groove, but rather on the tension designed into its spring-type construction.

With the addition of two chrome-plated rails of SAE 1070 steel, the second piston ring is formed, that which combines expander and spacer rings into one unit. This concept is reported to provide an extra factor for long life.

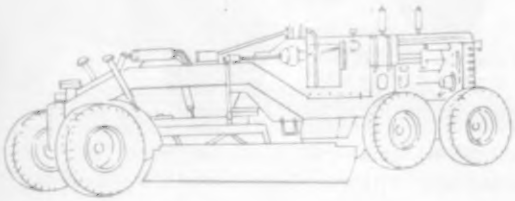
The combination unit conforms easily to piston walls, avoiding the need for high seating pressures.

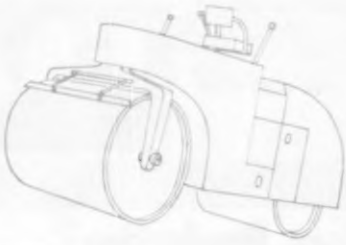
Here's A Spring Steel That—

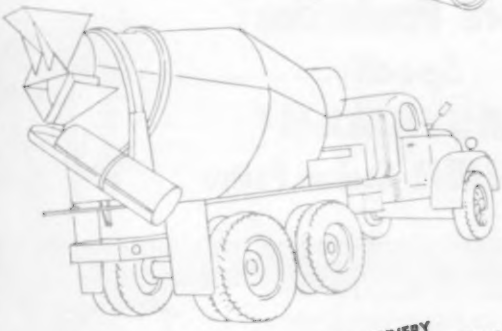
Withstands severe cold forming
Costs little
Enables output of 4000 parts hourly
Lends itself to die forming on automatic machinery

Acme-Newport Steel

STURDY AND STRONG FOR HEAVY EQUIPMENT



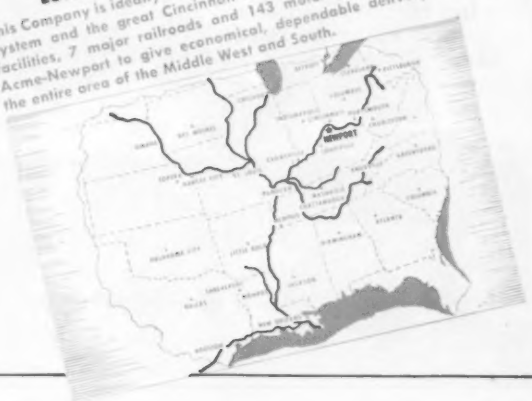




Acme-Newport produces flat-rolled steel required to build today's jolting monsters. Concrete mixers, mining equipment, road rollers, power shovels, tractors, bulldozers, are but a few. Exacting laboratory control and seventy years of quality steelmaking here combine with modern furnaces, rolling mills and other facilities to meet the most exacting individual specifications. Situated in the heart of the nation's greatest industrial development, Acme-Newport also provides faster, more economical delivery throughout this vast area. Before you buy again, consult Acme-Newport about your needs.

ECONOMICAL WATERAIL-TRUCK DELIVERY

This Company is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 143 motor carriers enable Acme-Newport to give economical, dependable delivery to the entire area of the Middle West and South.



Acme-Newport Steel
COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

FREE AIDS

New Technical Literature:

Catalogs and Bulletins

Regulators, welding

Sales promotion literature offers data on welding and cutting equipment and information on regulators. Covered are rugged cutting torches, welding and cutting outfits, gas regulators and welding units. *The K-G Equipment Co.*

For free copy circle No. 1 on postcard, p. 97

Amplifier

New four-page bulletin describes an ultra sensitive, zero-drift galvanometer amplifier for measurement of extremely low currents and potentials. The amplifier features a continuously variable sensitivity giving a full 5-milliampere output for any input from 5 to 50-millivolts. The unit is produced in Great Britain. *Jarrell-Ash Co.*

For free copy circle No. 2 on postcard, p. 97

Steel castings

Case histories of two steel castings for aircraft are contained in a presently obtainable folder. These appear in problem and solution form. Their significance to designers and engineers in the industry is argued. The booklet explains a relatively new Ceramicast process for casting steel. *Lebanon Steel Foundry.*

For free copy circle No. 3 on postcard, p. 97

Flush doors

Hollow and solid core flush doors are presented in a folder now available. It contains descriptions of a company's line of hollow and solid core flush doors for commercial and industrial use. A section devoted to specifications and species is also included. *Atlas Plywood Corp.*

For free copy circle No. 4 on postcard, p. 97

Bronze filters

Processing and testing methods for bronze filters are listed in a dozen page brochure. Perfecting an ideal flute medium is explained. Bronze filter materials, processing procedures and theoretical aspects of the sintering of bronze filter materials are covered. *Metals Disintegrating Co., Inc.*

For free copy circle No. 5 on postcard, p. 97

Pneumatics

An automatic welder that uses air power for 22 different operations is pictured in a dozen page publication. It explains how this is done, contains photographs of the machine, and details the operation sequence. Other items on pneumatic applications are also contained. *Ross Operating Valve Co.*

For free copy circle No. 6 on postcard, p. 97

Fasteners

Dramatically presented, a new folder shows some of the uses of a firm's bolts and nuts. Several photographs show structures held together with these fasteners. Speed, strength and savings are key advantages listed. *Automatic Nut Co.*

For free copy circle No. 7 on postcard, p. 97

Arc welding

Advantages and features of a versatile arc welder appear in a 20-page publication. It explains these as: (1) simplest automatic welder to adapt to fixtures, (2) universal head positioning, (3) fine vertical adjustment, (4) choice of electrode contacts, (5) easy maintenance, (6) operation from any fixture control, (7) automatic flux valve and (8) field operation without line power. *The Lincoln Electric Co.*

For free copy circle No. 8 on postcard, p. 97

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 97.

Fork truck

A four-page folder describes a new 6000-lb capacity electric powered fork truck. Two standard models are available: a 68-in. high model for freight car and truck loading, and a 83-in. high model for high tiering where headroom is unrestricted. The 68-in. model employs a duplex lift cylinder which provides 49-in. of initial lift. The 83-in. model has a simple acting cylinder providing 17-in. of initial lift. *The Elwell-Parker Electric Co.*

For free copy circle No. 9 on postcard, p. 97

Engineering data

Selected scientific and engineering tables and data supplement contains a variety of technical information. Selection of the charts and tables is based on a combination of their utility and the infrequency of their publication in standard references. Many of the tables are original. The result is a unique compilation of technological information in the fields of chemistry, physics, engineering, plastics, bacteriology, leather, psychometrics and textiles. *United States Testing Co., Inc.*

For free copy circle No. 10 on postcard, p. 97

Thermal analyzers

Containing 16 pages, a new booklet includes information on application and operation of thermal conductivity analyzers. Complete with photographs, drawings and diagrams, it offers information to those interested in continuous gas analysis instruments. This booklet was originally intended for the manufacturer's own field personnel. *Arnold O. Beckman, Inc.*

For free copy circle No. 11 on postcard, p. 97

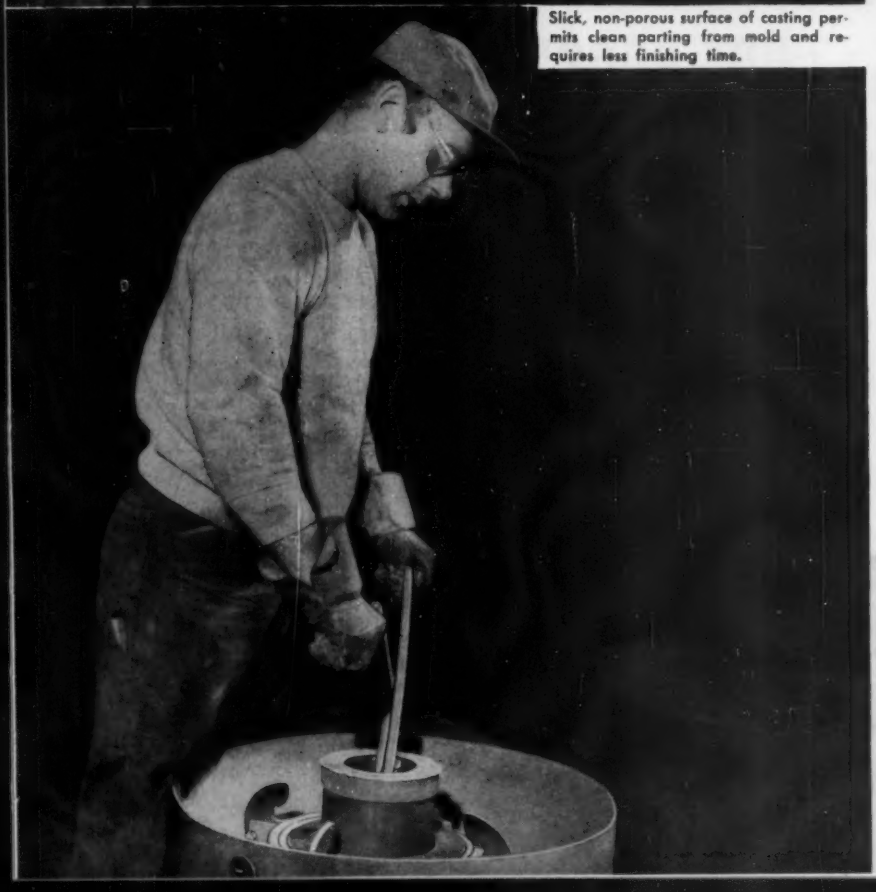
Dust control

Control of dust from coal and coke handling operations is discussed in a new booklet. It analyzes the use of local exhaust ventilation and cloth — tube-type dust collectors. Four illustrated case histories are presented. Some diagrams of materials handling systems and how dust control is exercised in them are presented. *Wheelabrator Corp.*

For free copy circle No. 12 on postcard, p. 97

dag 'dag' dispersions... *a touch does so much!*

After mold is machined, undiluted 'Prodag' is rubbed on the inside with a cloth.



Slick, non-porous surface of casting permits clean parting from mold and requires less finishing time.

"Mold treatment with 'Prodag' for better products at low cost."

says Wisconsin Centrifugal Foundry

Wisconsin Centrifugal Foundry casts sleeve-type brass bearings in graphite molds. Castings range from 2 inches to 30 inches in diameter; pouring temperatures from 2,000 to 2,200°F. This company has found that a single application of undiluted **'Prodag'**, rubbed into the mold, lasts for entire production runs of certain items. Molten metal does not adhere to the inside surface, so castings part easily. Less time is required for finishing, so rejects are fewer. **'Prodag'** helps Wisconsin Centrifugal turn out a better product at a lower cost.

'Prodag' and other Acheson dispersions have become indispensable for many foundry applications because of their remarkable properties under the most severe conditions. Acheson Service Engineers will be glad to give you specific information on the use of **'dag'** dispersions for mold coatings, maintenance lubrication, and other applications. No obligation, of course.

For ready-to-use materials containing 'dag' dispersions see your own oil supplier, or write directly to us.

100th Anniversary

1891—SILICON CARBIDE
1896—SYNTHETIC GRAPHITE
1906—COLLOIDAL GRAPHITE

ACHESON COLLOIDS COMPANY

PORT HURON, MICHIGAN

...also Acheson Colloids Ltd., London, England

ACHESON COLLOIDAL DISPERSIONS:
Graphite • Molybdenum Disulfide • Zinc Oxide
Mica and other solids

'dag' and 'Prodag' are registered trademarks of Acheson Industries, Inc.

Offices in: **Boston • Chicago • Cleveland • Dayton Detroit • Los Angeles • Milwaukee • Philadelphia New York • Pittsburgh • Rochester • St. Louis • Toronto**

Acheson Colloids Company
Port Huron, Michigan, Dept. D-12

Yes, I want your free bulletin No. 425 describing 'dag' Dispersions in Metal Casting Operations.

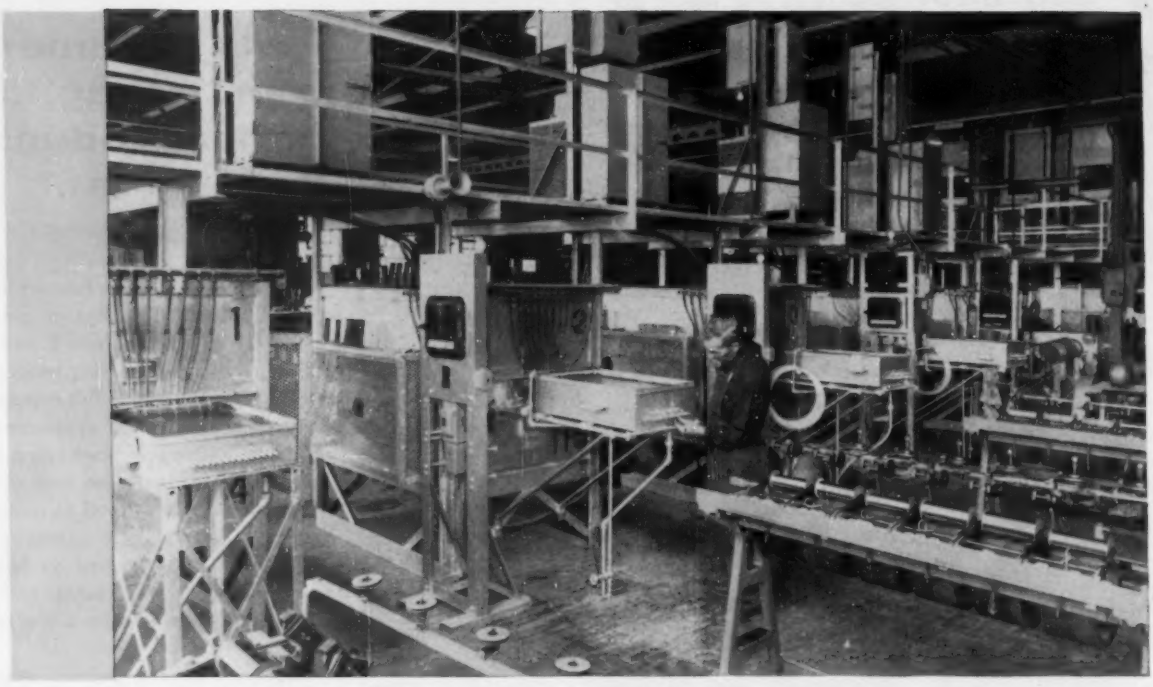
Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____



Now Completely Equipped With "Hot Rods." Part of a battery of nine electric strand bright annealing furnaces at the Dunkirk, N. Y., plant of Allegheny Ludlum Steel Corporation. Wire is annealed in these furnaces in alloy tubes containing a dissociated ammonia atmosphere. Operating temperature averages 2200°F. Furnaces are shut down after a five- or six-day working week.

Why Allegheny Ludlum converted to "HOT RODS"

Leading steel manufacturer reports longer life, improved performance, with CRYSTOLON heating elements*

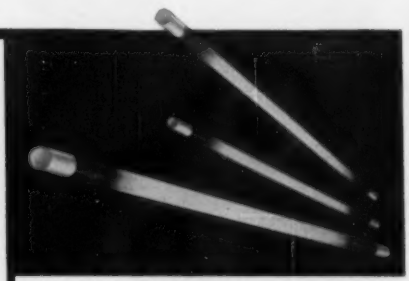
Allegheny Ludlum Steel Corporation hoped to improve the varying performance and service life of the heating elements originally installed in their electric wire-annealing furnaces.

So, they converted all nine furnaces completely to Norton "Hot Rods" — and got the improvements they wanted from the very start. For example, one set of "Hot Rods" was recently removed after 10,000 hours of trouble-free service.

Proved "Hot Rod" Advantages

Many plants report Norton CRYSTOLON heating elements outlast other non-metallic heating elements *up to 3 to 1!* This much longer life means savings in element costs, because fewer "Hot Rods" are needed. Also, you get reduced maintenance, due to less changing of elements or voltage taps. And "Hot Rods" help protect product quality because their slow, evenly matched rate of resistance increase means more uniform heating.

The big illustrated booklet, *Norton Heating Elements,* gives further facts on how "Hot Rods" can help improve your furnace operations and cut costs. For your copy write to NORTON COMPANY, Refractories Division, 211 New Bond Street, Worcester 6, Massachusetts.



Norton CRYSTOLON Heating Elements, or "Hot Rods," are a typical Norton R_x — an expertly engineered refractory prescription for greater efficiency and economy in electric kiln and furnace operation. Made of self-bonded silicon carbide, each rod has a central hot zone and cold ends. Aluminum-sprayed tips and metal-impregnated ends minimize resistance and power loss. Available in standard sizes.

NORTON

REFRACTORIES

Engineered... R_x ...Prescribed

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Behr-cat Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 92.

Screw-machines

Estimating costs of screw machine products by use of nomographs is the subject of reading matter now obtainable. It provides a convenient method of checking the calculations made by other, more involved methods. These nomographs can be useful in checking or estimating production and costs on secondary operations as well as other operations in any plant. *The Eastern Machine Screw Corp.*

For free copy circle No. 13 on postcard

Solubilizer

An organic type water-softener, solubilizer, sequestering agent and stabilizer is introduced in a technical bulletin. It describes properties and many applications, together with a current price schedule. Samples of the material will be furnished gratis to all domestic companies when requests are made on business letterheads. *Globe Compound Co., Inc.*

For free copy circle No. 14 on postcard

Lighting

Advantages and usages of the new very high output fluorescent lamps are described in a four-page brochure now available. Features of the lamp are detailed in the colorfully-designed brochure, which also depicts usages. The VHO lamp, as the brochure points out, is a different design concept of fluorescent lighting. Four outstanding features are highlighted: efficient lamp diameter, rapid start continuous filament heating, "pressure control" center, and the use of neon gas instead of argon. *Sylvania Electric Products Inc.*

For free copy circle No. 15 on postcard

Handling

Prepared especially for fork truck users, a new 16-page publication presents an illustrated story on how modern material handling methods saved $160,000 in a single year for a manufacturer. It also offers tips on buying fork trucks, as well as humorous non-related articles for general entertainment. *Lewis-Shepard Products, Inc.*

For free copy circle No. 16 on postcard

Warehousing

A new roster of members has been published by a steel warehousing association. It contains names, addresses and telephone numbers of over 850 member companies in the association. Warehouses are listed alphabetically and by 24 regional groups. This new publication also contains, for the first time, the names of approximately 2500 member company executives and branch plant managers. *American Steel Warehouse Assn.*

For free copy circle No. 17 on postcard

High pressure cleaner

Instant choice of many types of cleaning action is the prime feature of a new high pressure cleaner. So states a presently available folder. By simply setting valves on the control panel, the operator can get from 400 gph of clear cold water at 450-lb pressure, up to a mixture of steam, water and cleaning compound at 325° F. The equipment is available in portable or stationary models with either electric motor or gasoline engine driven pumps, and a choice of oil or gas for fuel. *Homestead Valve Mfg. Co.*

For free copy circle No. 18 on postcard

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **12/20/56**

Circle numbers for Free Technical Literature or information on New Equipment:

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11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
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51	52	53	54	55	56	57	58	59	60

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Company .....

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City ..... Zone .....

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FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N. Y.

Heat treating

Economic features of completely mechanized heat treat lines are covered in a new folder. It shows 24 basic furnace mechanisms with isometric drawings. Photos and diagrams illustrate steps used in building automated lines to insure better end product quality with absolute accuracy. It is a comprehensive commentary on mechanized heat treating. *Surface Combustion Corp.*

For free copy circle No. 19 on postcard

Switches

Heavy duty precision switches for machine tools and other industrial equipment are described in a folder. Attractively illustrated, it covers several types of switches. The brochure explains how these result in increased production. At the same time, it relates, reductions come about in accident rates, material waste and down-time. *Micro Switch Div., Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 20 on postcard

Silicones

One company's 1957 reference guide to their silicone materials has just been published. It describes almost 150 commercially available silicone products, including several developed this year. Products are grouped by usage (water-repellents, dielectrics, release agents, etc). Descriptions are brief, with emphasis on charts, tables and graphs directly comparing various silicones with the materials they are displacing. *Dow Corning Corp.*

For free copy circle No. 21 on postcard

Guided missiles

A 20-page bulletin outlining the engineering and manufacturing qualifications of ALCO Products, Inc. as a missile fabricator is available from the company. The two-color publication details ALCO's role as a major defense supplier—experience that dates to 1860 and includes more than $700 million in defense contracts in the last five years alone. *ALCO Products, Inc.*

For free copy circle No. 22 on postcard

Aluminum structures

An illustrated brochure outlines capabilities and facilities of aluminum structures. The 12-page publication discusses advantages of using aluminum for structural applications. It outlines design concepts pertaining to aluminum extrusions. Facilities, company history, structural applications, mechanical properties, and a comparison of aluminum and steel sections are also presented. *Harvey Aluminum Structures.*

For free copy circle No. 23 on postcard

Nondestructive tests

A 16 page booklet now available covers a widely used nondestructive test. Recently, an independent, personal interview survey of metalworking plants showed that more than half of them are gaining less than 50 pct of the potential profit from the nondestructive tests they are currently using. The booklet mentions how savings can be obtained by the correctly particle testing equipment. *Magnaflux Corp.*

For free copy circle No. 24 on postcard

One-piece windows

Circular window-units may be used to observe internal operations, indicate flow, or show internal liquid level in a wide range of machines. A four-page brochure describes three different types of these units. Units are of one-piece construction, and are installed simply by pressing into a reamed hole in the equipment in which it is used. *Bijur Lubrication Corp.*

For free copy circle No. 25 on postcard

Labor & boxes

Titled "How to Save Labor Costs with Corrugated Boxes," a new booklet deals with what is one of the most important problems facing industrial management. It presents a careful study of the packaging lines of many different kinds of manufacturers. The booklet is packed with specific suggestions which can be put to immediate use by anybody who ships anything. *Hinde & Dauch.*

For free copy circle No. 26 on postcard

BUSINESS REPLY CARD

No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE

Post Office Box 77

Village Station

NEW YORK 14, N. Y.

FIRST CLASS PERMIT No. 36 (Sec. 34.9 P.L.&R.) New York, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **12/20/56**

Circle numbers for Free Technical Literature or Information on New Equipment:

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Page ..... Product .....

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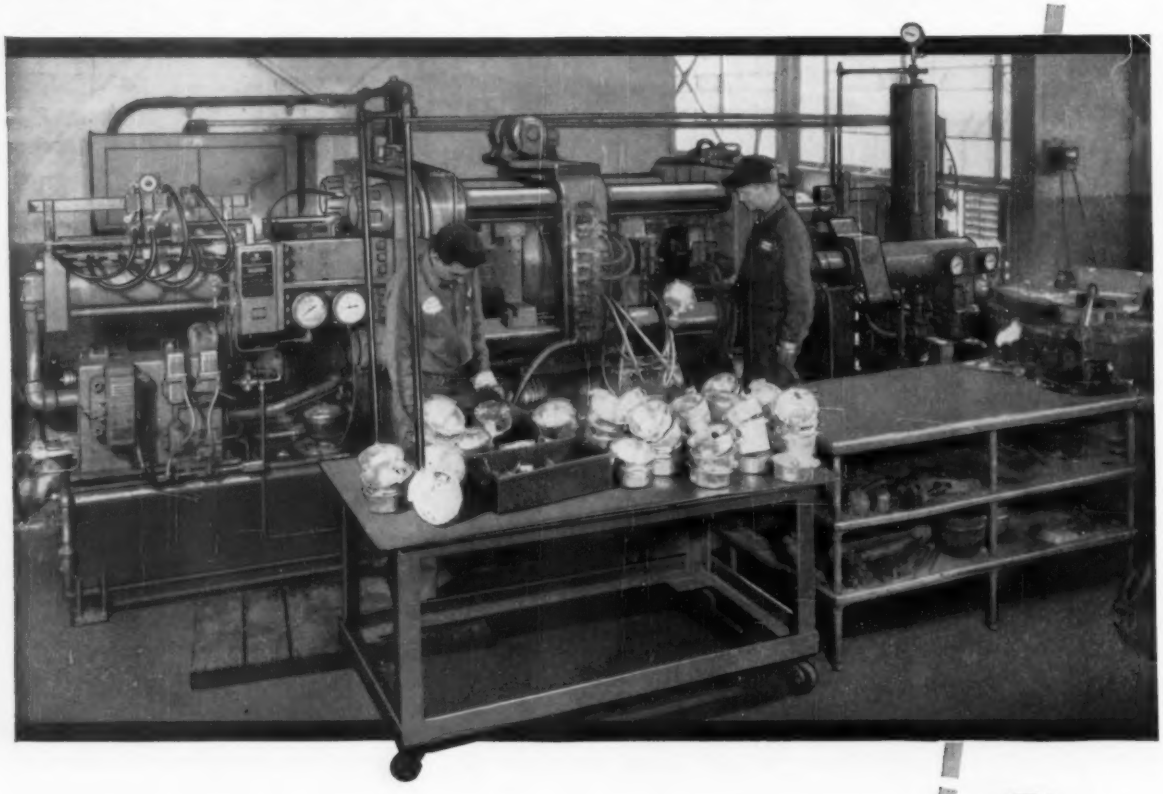
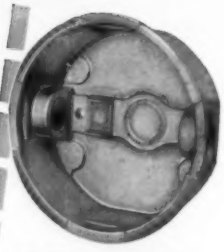
SUPERIOR stainless strip steels
precise in composition
uniform in handling ease
versatile in application
You can depend upon the fine behavior of Superior Stainless Strip Steels—every step of the way from initial uncoiling in your plant to long and satisfactory product service in the hands of your customers. • We build precise uniformity into every Superior grade: each grade has its specific and profitable field of applications. Let us cooperate on your needs!
Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

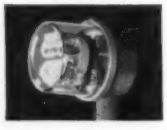
MORE DIE CASTING - LESS SCRAP



New H-P-M Ups Production For Basic Aluminum Castings Co.

"By moving several jobs from a conventional toggle type machine to our new H-P-M, we reduced scrap loss to a minimum . . . at the same time we increased production." This report from T. M. Byrne, President, Basic Aluminum Castings Co. of Cleveland is typical. H-P-M die casting machines are doing an outstanding job for die casters throughout the country and here are the reasons why: They are designed to entirely new theories of metal injection and clamping. The new exclusive hydraulic-mechanical link-wedge clamp has plenty of "beef"—clamp locks die firmly to rated capacity and better. "Beef" limits die parting on overload during metal injection. Results—flash and scrap loss reduced to a minimum . . . quality parts produced to accurate dimensional tolerances. The new injection end has unlimited plunger motion control . . . exceptionally high speed. Call in an H-P-M engineer today and let him give you the complete facts before you buy. You'll be glad you did.





Watthour meter socket cast in a single cavity die on an H-P-M 400-ton die casting machine at Basic Aluminum Castings Co. This is a 1½ pound shot. Production—140 an hour.

HPM

THE HYDRAULIC PRESS MFG. CO.

Mount Gilead, Ohio, U.S.A.

A DIVISION OF KOEHRING COMPANY

DEPENDABLE QUALITY...

SAVINGS TOO!

Users of Metal Blast's SUPER-ANNEALSHOT live "high off the hog"! For Metal Blast guarantees the most dependable quality of any abrasive on the market. Yet, because it takes advantage of all the economies of mass production, Metal Blast prices are right in line and, in some cases, lower! So, to begin with, you pay no more, but still get the savings inherent with top quality. We'd sure appreciate a trial!

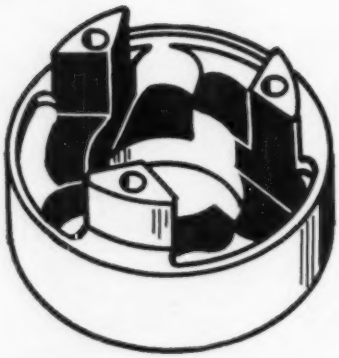
METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

PRODUCING THE FINEST CHILLED AND MALLEABLE SHOT AND GRIT ON THE MARKET

CUSTOMER SPECIFIED

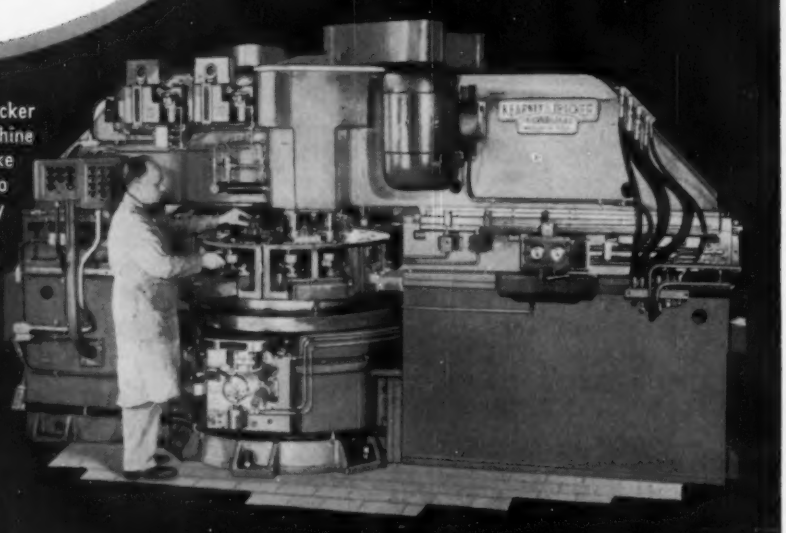
An automotive manufacturer recently asked Kearney & Trecker to design and build a special machine which would increase production milling of three pads and three pockets on transmission rear brake drums.



Black indicates machined pads and pockets on transmission brake drum.

KEARNEY & TRECKER DESIGNED

Here is our design. It's a Kearney & Trecker six-station rotary indexing milling machine which mills 162 transmission rear brake drums per hour. It does the work of two machines, each of which could mill only one workpiece at one time. With the new unit, six pieces are milled at once. A prominent feature of this machine was the application of standard Kearney & Trecker units . . . a 48" rotary index table and a 24" feed slide. This type of design appreciably decreases the overall cost of the machine. All six spindles are contained in one head which is bridged over the table. Retractable quills raise and lower the spindles.



New production efficiency starts with Kearney & Trecker Milwaukee machine tools

This typical example proves you can reduce costs and start on the road to higher production with machines designed and built by Kearney & Trecker's Special Machinery Division. With more than 50 years' experience in machine design and manufacture, Kearney & Trecker has all the ingenuity and skill required to solve special machining and production problems.

Why don't you take advantage of our abilities? They can pay off in profits for you. Your Kearney & Trecker Special Machinery Division representative will be pleased to give you all details. Call him today!

For more details on the machine illustrated ask for Data Sheet No. 1044. The free booklet "Doorway to a proven method for solution of big and small metalworking problems" is also yours for the asking.

KEARNEY & TRECKER MILWAUKEE

Special Machinery Division

MILWAUKEE 14, WISCONSIN, U.S.A.

Builders of Precision and Production Machine Tools Since 1898

STAMPINGS: Moldings

Rapid movement of window parts from one press operation to another saves time, provides economy . . . Even more important, however, it prevents stampings from being scratched.

Garnish moldings, such as those for rear quarter automobile windows are among many stampings manufactured by Ternstedt Div. of General Motors Corp. The parts require a series of press operations. Equipment for rapid handling between these setups is important, not only in attaining high economy, but in avoiding scratching.

In the first operation, a blank receives its first draw. Loading is done by a slide using a rocking ejector. The workpiece slides onto a belt carrying the part to the next press. Subsequently, the machine pierces out the stamping's center portion.

Eight hydraulic punches on this unit pierce the stamping.

On this unit, there is also an automatic rocking ejector that delivers the pierced stamping to a second belt. After a redraw and a glass edge flanging operation, the stamping reaches a press that trims the entire contour. Another rocking ejector delivers the trimmed piece to another belt.

Following a series of other press operations, the stamping reaches a hydraulic piercing machine. This has eight cylinders whose plungers operate eight punches. Each punch pierces and countersinks one hole.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 97. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Power:

Molten metals "wet" other metals.

Two Stanford University metallurgists have discovered a way to make molten metals "wet" other metals. This process is expected to increase greatly the efficiency of atomic power reactors and other modern power plants.

Steam Alone Is Problem

Atomic reactors generate electric power simply by converting the heat of nuclear reactions into steam that turns a dynamo. When steam alone is used, pressures mount critically. But molten (liquid) metals can be used to transport the heat of nuclear fission in forming the steam. This adds an extra step to the process. It permits a gradual conversion of nuclear heat into electric power.

Liquid metal (molten lead, bismuth, etc.) heat-transfer systems are becoming of increasing interest in power engineering. By eliminating extremely high pressures, such systems simplify the problem

of designing efficient, compact power generators. This is particularly true in the design of atomic reactors. Here, the plant's nuclear "furnace" must be isolated completely from human contact.

A special difficulty of liquid metal systems, however, has been their failure to "wet" the surfaces of other metals with which they must make intimate contact in the process of heat transfer.

The problem was like that of water failing to wet fabrics thoroughly, which once gave trouble to the laundering and dyeing industries. Chemists solved that with a "wetting agent" now used in some soaps and detergents.

In the case of liquid metal, the Stanford scientists discovered that an invisible oxide film on the solid metal surfaces was blocking the wetting action. They found they could get rid of this film by heating the solid metal in a vacuum beyond a certain critical temperature (above 1500° F for steel and tantalum, which they tested).

Contains Carbon

These solid metals contain minute quantities of carbon. When they are heated in the absence of oxygen (in a vacuum) the carbon "migrates" to the metal's surface. There it reacts with the oxide film to produce carbon monoxide gas.

The gas is pumped off easily, leaving a clean metal surface. This can readily be wet by liquid metal. In a sealed heat-transfer system where oxygen can't reach it, the "wettable" metal will function indefinitely.

Professor O. Cutler Shepard and Dr. Edward P. French are the process' developers.

Corrosion:

Granite gray case paint resists discoloration.

Tests show that a new granite gray case paint and cadmium plated cover for General Electric Company's drawn oval air conditioning capacitors resist corrosion discoloration, pinpointing and blistering.

Capacitors with the new case finish and cadmium plated covers were subjected to 20-pct salt fog for 2000-hours at 95°F. They showed no signs of corrosion.

Joining:

Teflon now can be joined to materials.

The Flexrock Co., Philadelphia, is now surface treating Teflon sheets and tapes for bonding purposes. The process alters the surface of Teflon to make possible permanent bonding to a variety of materials with conventional commercial adhesives. Good bond strengths have been obtained between aluminum, mild steel, wood, and Teflon. Limited quantities of "Bondable Teflon" are available for commercial use.

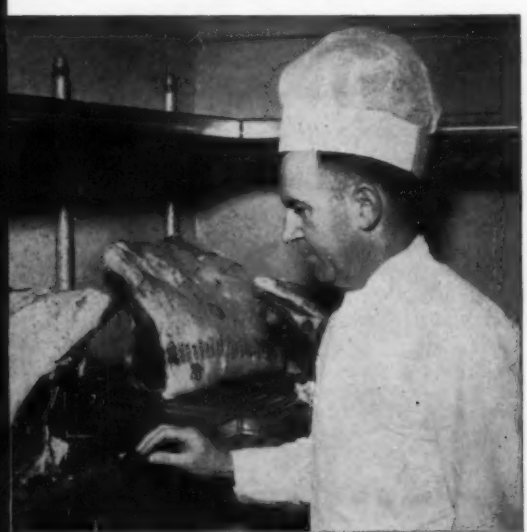
FOR COMPLEX FABRICATION. In chemical plants, these Stainless Steel acid catchers are used to remove dilute sulfuric acid from gases. Continental Boiler & Sheet Iron Works in St. Louis fabricated the units. Notice the complicated curves in the helix plates, and the neat joinery . . . a tribute to fine craftsmanship and the workability of Stainless Steel.

FOR ABRASION AND CORROSION RESISTANCE. Oil can racks stand out in all kinds of weather, and the support strips are constantly rubbed and knocked by the heavy cans of oil. Modern Metal Products Company of Greensboro, N. C. makes the strips out of Stainless Steel so they will stay bright and new-looking, and never get banged out of shape.

NOTHING *can equal* *Stainless Steel*

In its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.



FOR SANITATION. These Stainless Steel shelves are made by the Eastern Steel Rack Company, Boston, Massachusetts, for use in cold storage rooms. They are easy to clean, and offer a sanitary, corrosion-resistant surface for food products of all kinds.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS
PIPE • TUBES • WIRE • SPECIAL SECTIONS

USS

UNITED STATES STEEL

12½-minute baking cycle overhead speeds production below

Far-sighted planning by The Wright Line, Inc., prevented costly production line bottlenecks in their new one-story plant in Worcester, Mass. By suspending compact Fostoria Radiant Ovens ceiling-high . . . drying the "fine-wrinkle" finish on their metal card-handling cabinets is accomplished in 12½ minutes through controlled 365° F. radiant heat—and without interrupting the continuous flow of products at floor level!

Painted units are conveyed from spray booths upwards through 5' x 6' tunnel openings in their two 28½-foot Fostoria infrared ovens, for a fast, uniform baking-out operation. Valuable floor space is saved, production moves smoothly, and a better finish is assured at lower cost through efficient Fostoria radiant heat.

Consulting your Fostoria sales engineer can bring out some important cost-saving solutions to your finishing problems . . . heating, degreasing, baking, drying. He'll give you the facts on Fostoria radiant equipment — infrared lamp, quartz lamp or radiant rod—that will do the most work for you at lowest cost.

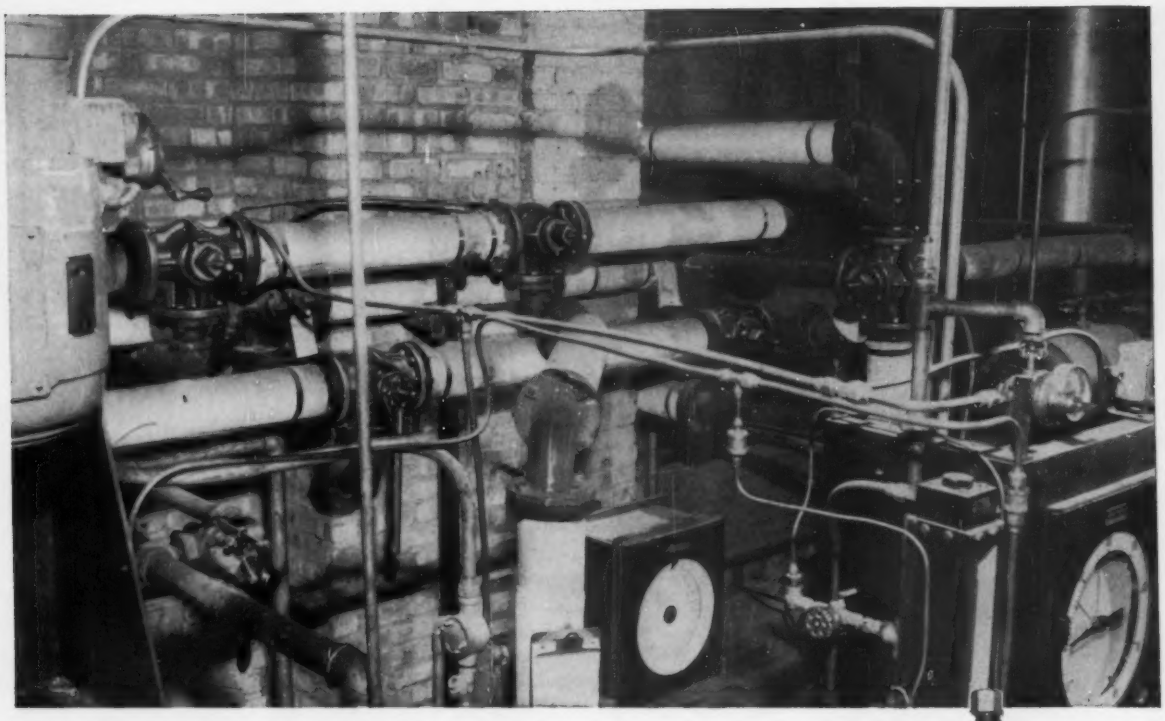
Write for free 20-page book, "Radiant Heat—applications unlimited"

INFRA-RED fostoria SYSTEM

5513

FOSTORIA PRESSED STEEL CORPORATION • Dept. 1224, Fostoria, Ohio

Pioneer manufacturer of radiant equipment—components and complete ovens



The T. F. Washburn Company uses...

HOMESTEAD *Lubricated* PLUG VALVES

ON LINES THAT

HANDLE HOT VARNISH AND RESIN BASE MATERIAL AT 500° F.

BECAUSE....

1. Previous Homestead Installations Gave Excellent Performance

2. Homestead Engineering Representative Rendered Fine Service on Installation Layout

Excellent performance of Homestead Lubricated Valves in the control of Jelled Paint Products at T. F. Washburn Company, is guaranteed by built-in features, such as: 100% pipe area, and controlled pressurized lubrication. Used on lines to thinning tanks, these three-way Homestead Valves have the same area as that of the pipe line, and thus permit full flow with minimum pressure drop—an important advantage on the low operating pressure of less than five pounds per square inch. Also, the exclusive *controlled* pressurized lubricant system of Homestead Valves prevents contamination of line fluids or clogging of the low pressure lines with lubricant.

Exclusive features, such as these, guarantee long low cost service from *all* types of Homestead Lubricated Plug Valves. For full information, write for Reference Book 39-5. There is no obligation.

USE THIS TIME-SAVER COUPON IF YOU PREFER.

HOMESTEAD
VALVE MANUFACTURING COMPANY
"Serving Since 1892"
P.O. BOX 23, CORAOPOLIS, PA.

Without obligation, please send me Reference Book No. 39-5 covering Homestead Lubricated Plug Valves.

Name_____ Title_____

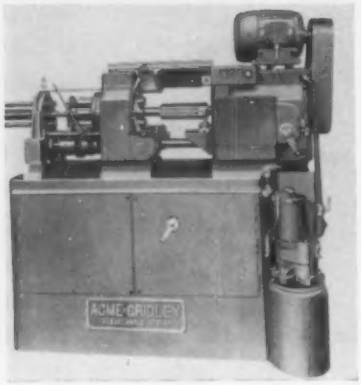
Company_____

Address_____

City_____ State_____

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 97 or 98.



Bar automatics manufacture small parts

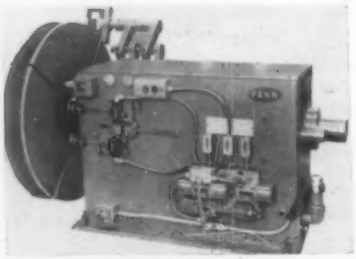
For manufacturing small, high-production parts, this 7/16-in. multiple spindle bar automatic measures approximately 5-ft high, 5½-ft long (16-ft including the stock reel). Its working position is high enough so that the operator can work in an erect and comfortable stance. It also features ample room for adjustment and tool changes in an "open" tooling zone. The new machine has spindle speeds up to 4500-rpm in standard models and up to 3200-rpm in models equipped with spindle stopping mechanism. Although the spindle capacity is 7/16-in. using standard collet and pusher tubes, it can be increased when necessary by using combined pushers and pusher tubes to accommodate ½-in. round or 7/16-in. hexagonal stock. Its toolslide is of the standard flat surface design with center keyway. *The National Acme Co.*

For more data circle No. 28 on postcard, p. 97

Portable unit nibbles corrugated sheet

This portable metal cutting nibbler cuts corrugated sheet metal and small diameter duct or sheet metal pipe. This is done without distorting, curling, or flattening of the corrugated curves on either side of the cut. It has a special nose piece and die holder. This is set at right angles to the body and permits handling ease as it rolls over the curves of the corrugated metal. Diagonal cuts across the curves can be made and circles as small as 2-in. in diameter can be cut without distorting, flattening, or curling of the metal. The nibbler weighs only 7½-lb and is only 10-in. overall. It has a ½-hp high speed motor, ball bearing, and operates from 110-v ac/dc single phase current. It does 33-in. of cutting per minute of 16-gage metal. *Fenway Machine Co.*

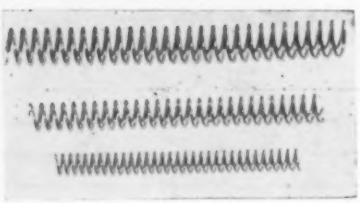
For more data circle No. 29 on postcard, p. 97



Wire flattening mills use take-up reels

New traversing take-up reels can be used in combination with wire flattening mills. Floor mounted, they have a 3-in. diam spindle and a 10-in. stroke. They include any combination of traverse and adjustment across the roll face which add up to 10-in. Maximum weight of stock which can be coiled is 2000-lb. Maximum permissible stock tension is 300-lb. Spindle mounts on one front bronze bearing and two rear ball bearings, allowing both traversing movement and rotary winding motion. *Fenn Mfg. Co.*

For more data circle No. 30 on postcard, p. 97



Stainless steel springs being made experimentally

Experimental stainless steel springs are being made in both open and closed wound types for development and research work. They are immediately available in five outside diameters and five wire sizes, ranging from O.D.'s of 3/32 to ⅜-in., wire diameters of 0.016 to 0.040-in. and lengths of 1¼ to 4-in., according to the manufacturer. *PIC Design Corp.*

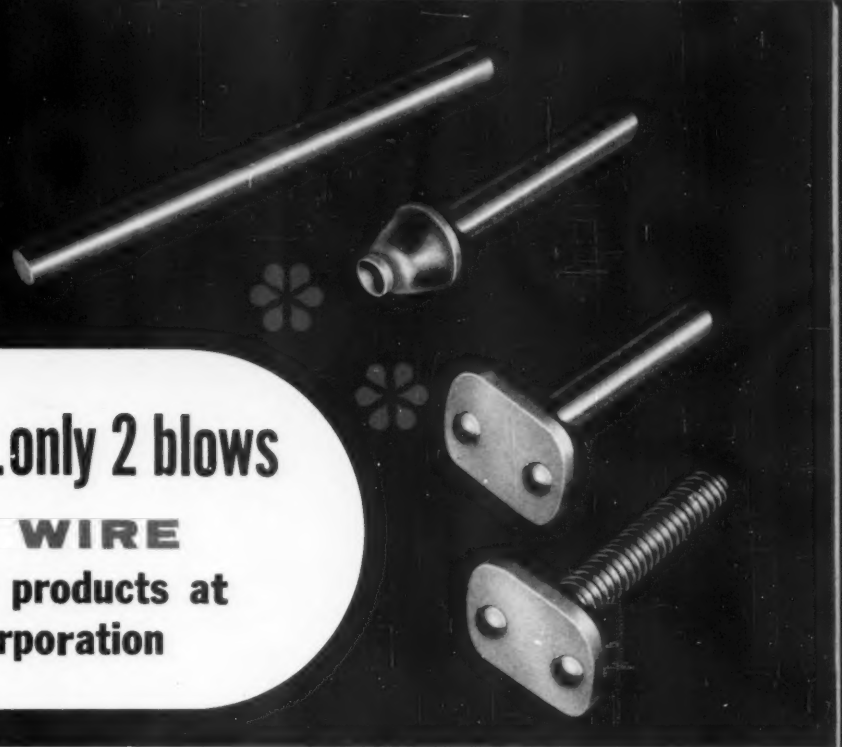
For more data circle No. 31 on postcard, p. 97

KEYSTONE XL WIRE STUDY

7 2/10 diameters...only 2 blows

KEYSTONE WIRE

gives uniform quality products at Midland Screw Corporation

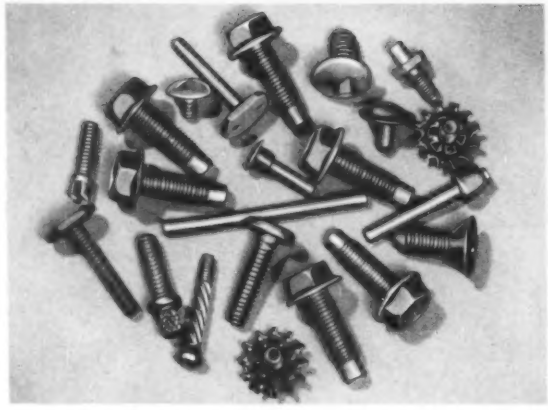


flowability IS THE SECRET

Midland Screw Corporation, Chicago, Ill., threw the rule book out the window when they cold headed, in 2 blows, the welding screw shown here. That's the way this progressive firm tackles many problems. They've learned that they can make the difficult—or well-nigh impossible—jobs, easy when they use Keystone "XL" Cold Heading Wire.

It will pay you to investigate the possibility of using Keystone "XL" Cold Heading Wire in designs that have been considered too complex for ordinary wire. Talk over your problems with your Keystone Wire Specialist. He will show you how the *flowability* characteristics of Keystone "XL" Wire can help you, too!

Keystone Steel & Wire Company, Peoria 7, Illinois



Here are a few of Midland's products. Note that this includes the hex head Spin Lock bolt which has been produced for 3 years for the automotive industry from Keystone Wire without a single reject.

KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

Mail coupon for free booklet—
COLD HEADING FACTS! Discusses methods, technical facts, wire requirements and other data.

Name_____ Title_____

Company_____

Street_____

City_____ State_____

KEYSTONE
WIRE FOR INDUSTRY

HARDINGE
ELMIRA, N.Y.

High Speed Precision
MILLING MACHINES

The RIGHT Size For Work Which is *Too Small for Heavy Duty Millers.*

Advantages

- Saves Production Time
- Higher Speeds
- Lower Power Consumption
- Less Investment
- Saves Floor Space

1 1/16" Cutter Spindle Capacity with 5C Round Hardinge Collet
Eight Spindle Speeds — 110 to 1850 R.P.M.

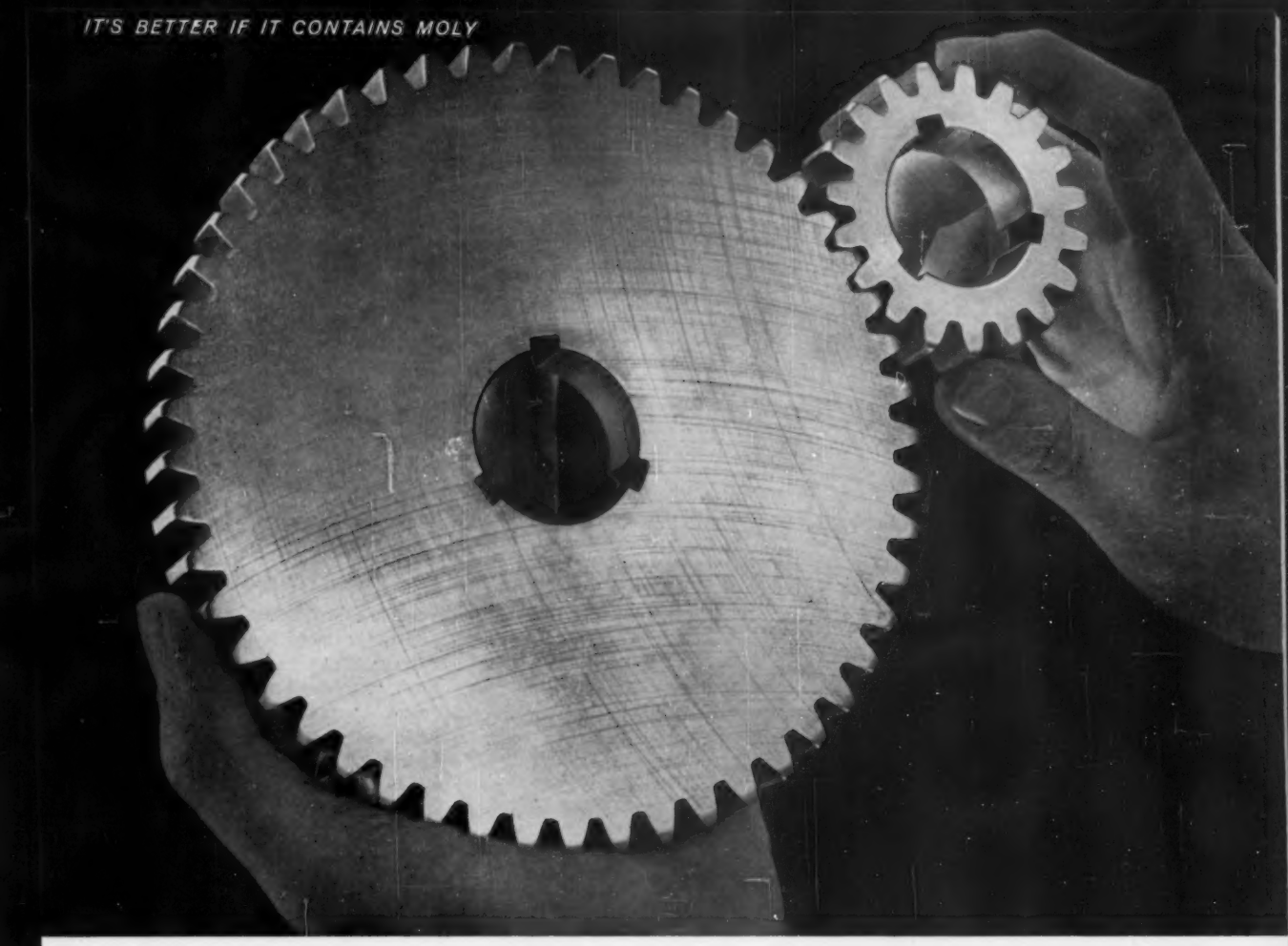
Write for Bulletin TM-UM

Model UM Universal Spiral Miller
Model TM Universal Plain Miller

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

OFFICES IN PRINCIPAL CITIES. Export Office: 269 Lafayette St., New York 12, N. Y.

IT'S BETTER IF IT CONTAINS MOLY



Up to 1% Moly in carburizing steels gives required hardenability economically

Why limit the use of molybdenum to the .15/.25% Mo and .20/.30% Mo contents of the traditional grades? For the contributions of moly do not stop there. Laboratory tests and production runs prove that as molybdenum contents increase up to 1%, hardness increases progressively. A wide range of case and core hardenabilities, therefore, can be obtained – economically, too.

Tests with a series of molybdenum-manganese steels show that these compositions give higher case hardness on a direct quench than other steels of comparable core hardenability. One extensively tested composition, for example, is 0.5% Mo – 0.5% Mn steel. It shows longer life, and is lower in cost than steels previously used. And it produces a higher case hardness with similar or less distortion. What's more, tool life and surface finish are equal or better. Good reasons why several companies have already adopted this grade for automotive gears and other critical applications.

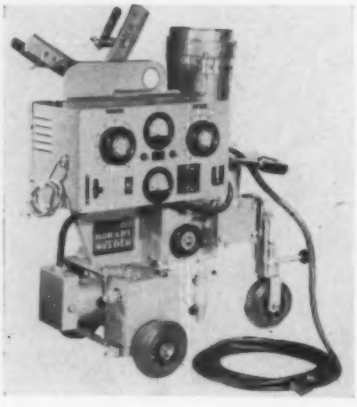
If you use carburizing steels, see what a higher molybdenum content can do for you. Part of the story is contained in the technical article "New Carburizing Steels For Critical Gearing." For your copy, or other technical data, write Climax Molybdenum Co., Dept. 2, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM

Load stabilizer tackles difficult jobs

For use with one manufacturer's electric fork trucks, a new load stabilizer handles loads of case goods that cannot be nested or tied together. It consists of three sponge rubber-lined pads. These are mounted on pivots so that loads with objects of varying heights can be handled. The ⅞-in. sponge rubber lining has a facing of tough neoprene to provide long life; the leading edge of the rubber lining is protected by a steel lip. It has a vertical stroke of 24-in., opening from a minimum height of 40-in. above the fork to a maximum of 64. Clamping area is 34-in. square, with each rubber pad measuring 32½-in. long by 8½-in. wide. All controls for raising and lowering the stabilizer are located adjacent to the operator's seat on the fork lift trucks. This means that the operator never has to dismount from the truck to operate the stabilizer unit. *Lewis-Shepard Products, Inc.*

For more data circle No. 32 on postcard, p. 97



Arc unit welds long seams, straight or curved

Operating automatically, a new tractor type submerged arc welding unit welds long seams, straight or curved. It welds backward or forward, either when locked into position for a straight line seam, or when maneuvered by the operator on a curved or irregular seam. An adjustable nozzle permits welding either on fillet or flat butt joints. The basic unit is a fully automatic submerged arc welder. A convenient, free-wheeling tractor type setup makes it highly maneuverable. Two models are available; one has remote control of welding voltage. Both have: basic welding head, wire-feed motor, convenient controls, moulded flux hopper, a wire reel, and the special tractor mounting. A 20-ft length of six-conductor control cable is standard equipment. Its manufacturer recommends the submerged arc welding unit for shipbuilding, structural and large tank welding and similar applications. *Hobart Bros., Inc.*

For more data circle No. 33 on postcard, p. 97

Microfilm camera copies at 42 to 1 reduction ratio

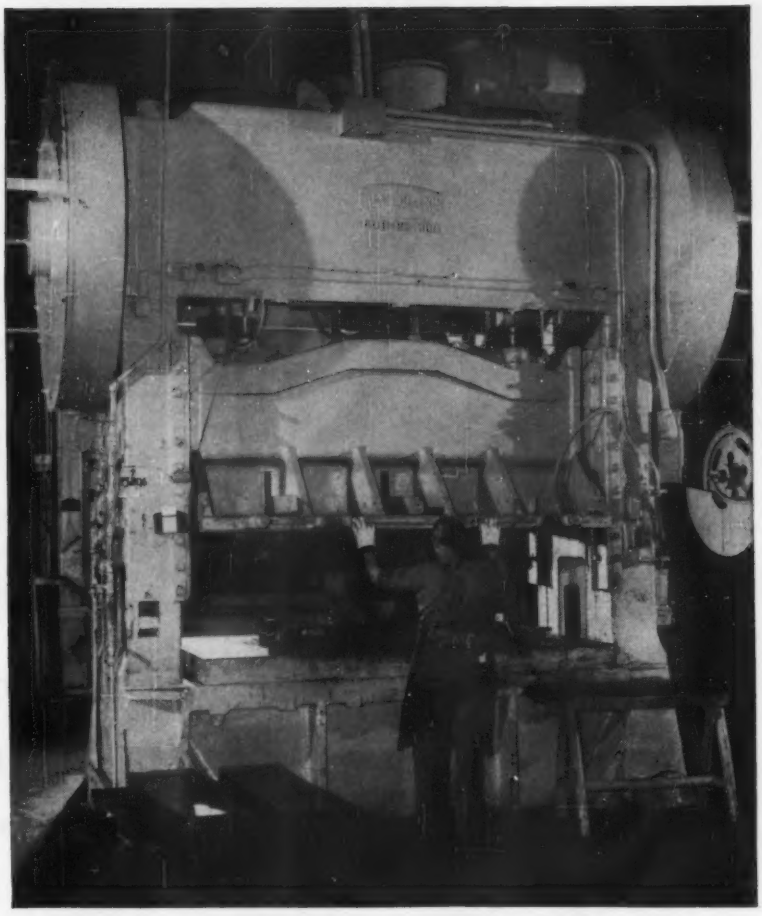
Precision-built, a compact, duplex microfilm camera photographs both sides of a document simultaneously at any of three reduction ratios. It incorporates features usually found in much larger cameras. The equipment has a 12-in. throat, and doubles 16mm film capacity by filming up one side and down the other (the 8mm principle). Interchangeable lenses allow reduction ratios for 25 to 1, 35 to 1, and 42 to 1. Full operating controls, warning buzzer and indicator lights assure simple, error-free microfilming; a special operator is unnecessary. Light intensity is adjustable for proper recording of vari-colored documents. Film capacity: 250-ft, 16mm daylight-type. *Remington-Rand Div., Sperry-Rand Corp.*

For more data circle No. 34 on postcard, p. 97

Coil grabs handle narrow width coil stock up to 5000-lb

Designed to assist in slitting operations, a new coil grab handles narrow width coil stock in capacities from 1000 to 5000-lb. The unit grips the coil on its inside and outside diameters without depending on anything by the clamping action. The hoist hook engages the grab direct. This eliminates necessity for roller chain. A screw type adjustment of the movable jaw makes the initial grip. When the hoist hook is raised, final complete gripping occurs through a cam action. This maintains its grip throughout the operation. Compact, easy to operate and safe, its makers say the grab will not damage stock. Units are designed to handle individual strapped coils and are usually used with a crane or hoist. Standard models lift 1000, 2000, 3000, 4000 and 5000-lb coils. *H. L. Bushman Co., Inc.*

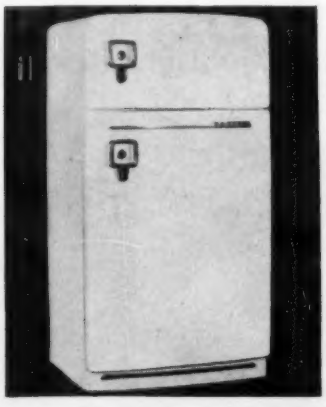
For more data circle No. 35 on postcard, p. 97



The Cleveland Double-Crank Press shown here draws more than seven parts for the famous Servel Refrigerator.

SERVEL, INC. finds Cleveland Presses

"require very little maintenance . . . have no clutch problems"



Installed in the Home Appliance Division of SERVEL, INC., Evansville, Indiana, in March of 1951, the Cleveland Double Crank Press you see here has been constantly "on the job" producing parts for famous Servel refrigerators.

Carl Linke, Foreman of the Sheet Metal Department, says, "This Cleveland 80D is a good press. We've used it for most of our draw work for the past five years. During this time it has required very little maintenance. We've had no clutch maintenance problems."

As have many of the nation's leading stamping departments, you, too, will find that Cleveland Presses prove themselves to be easy-to-maintain, low-cost producers. Before buying your next press be sure you have the complete Cleveland story. One of the 11 specialized types of Cleveland Presses is sure to be your answer to greater stamping economy. Write or call today!

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

POWER PRESSES – FABRICATING TOOLS

E. 40th & St. Clair Avenue, Cleveland 14, Ohio

Offices at: NEW YORK • CHICAGO • DETROIT
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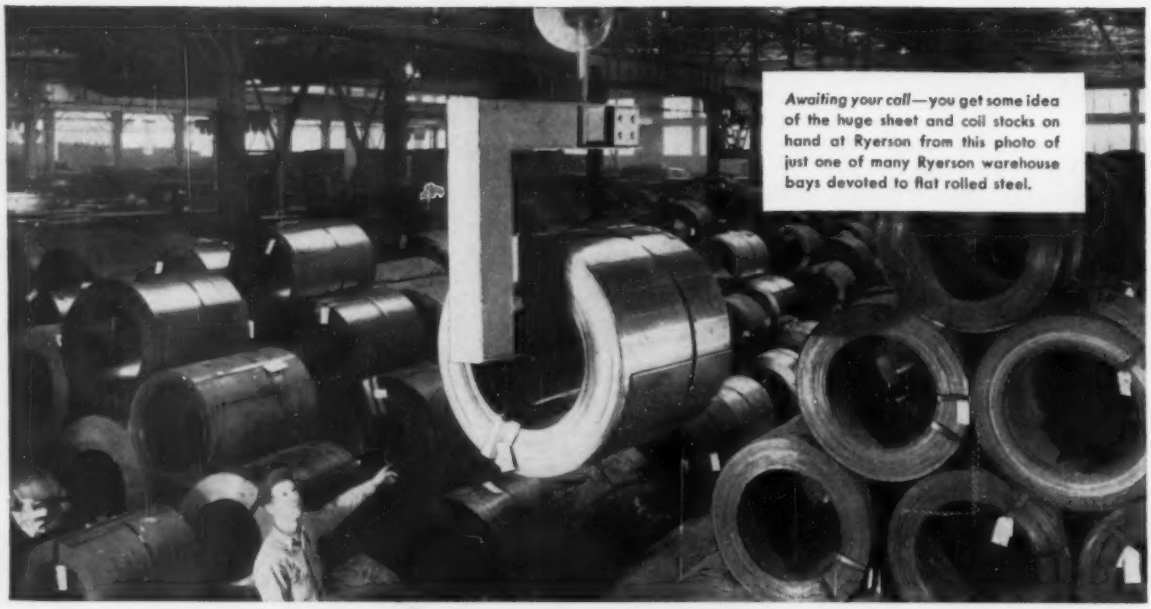
CITY FOUNDRY DIVISION • SMALL TOOL DEPARTMENT



Awaiting your call—you get some idea of the huge sheet and coil stocks on hand at Ryerson from this photo of just one of many Ryerson warehouse bays devoted to flat rolled steel.

On sheet and strip requirements...

are YOU getting this 3-point service?

Sheet and strip buyers tell us that three kinds of purchasing help keep them coming back to Ryerson:

1. WIDER SELECTION OF TYPES—More than 20 kinds of sheet and coil stock are on hand in an unusually wide range of gauges—making it easier to get the exact steel needed for any requirement.

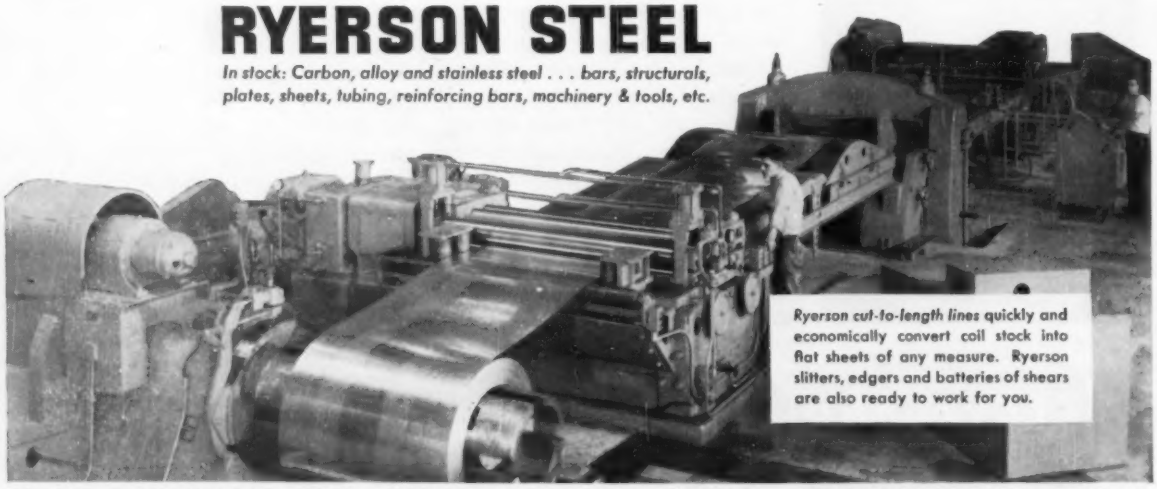
2. GREATER PROCESSING CAPACITY—The most extensive cutting and processing facilities in the steel-service industry enable buyers to get quickest service on requirements for special sizes, strip and sketch cutting, blanks, slit coils, edging, or any other processing.

3. HELP ON SHEET AND STRIP PROBLEMS—The large Ryerson staff of sheet and strip specialists gives buyers a valuable source of help in selecting the most satisfactory and economical stock—or in solving any other problem of application and fabrication.

In addition, sheet and strip buyers like the good packaging, the dependable weight and on-schedule delivery that they get from Ryerson—and the convenience of one-order buying of all steel products from the same source. So call your nearby Ryerson plant for 3-way help on sheet and strip needs.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel . . . bars, structurals, plates, sheets, tubing, reinforcing bars, machinery & tools, etc.



Ryerson cut-to-length lines quickly and economically convert coil stock into flat sheets of any measure. Ryerson slitters, edgers and batteries of shears are also ready to work for you.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY . . .

Rising costs force steel mills to increase extras on some products . . . Stainless base prices on the rise . . . Demand exceeds production . . . Scrap prices leveling off.

Prices Moving . . . The steel price pot is beginning to boil. The pressure of rising costs is being reflected in price extra hikes by some mills on important steel products, including sheets and alloy plates. Some stainless steel base prices began moving up last week.

Behind the breakthrough in steel prices is the growing list of steelmaking raw materials that have risen in price since the general steel price hike of last August. The latest of these raw material boosts affects nickel and ferroalloys.

On tonnage products, increases to date affect only those charges made by the mills for extra processing. Base prices are not affected, except for stainless steel, which involves only nickel-bearing grades.

Meanwhile, it looks as though the steel market will highball into 1957 at a near-record pace. Steel orders are running in excess of production, even though mills last week established an all-time record of 102.4 pct of capacity. Order carryovers into the new year will be heavy.

Oil Country Tightens . . . Demand is strong for virtually all products, but particularly plate and structurals. Oil country goods—steel products for drilling and casing of oil wells—will shortly be as hard to get as plate and structurals. Cold-rolled sheets also are tightening as automotive demand increases.

The demand for oil country goods is taxing the steel industry's capacity to produce. It's much the same for linepipe, whose production is limited by the shortage of plate.

With sales of new cars taking hold and production problems being ironed out, automakers are beginning to take more steel. Orders for February are up over January, which in turn is better than December. Order cancellations and holdups are tapering off.

Scrap Leveling . . . The mills are pushing furnaces to the limit as the year-end approaches. It looks as though production will exceed 115 million tons despite the 34-day strike of last summer. This is two million tons below the all-time record set in 1955. Holiday schedules probably will cut into production slightly in the last two weeks of the month.

Scrap prices are beginning to level off. Prices dropped in at least one major consuming area, while in others a softer tone prevailed, although prices held unchanged from last week. New IRON AGE scrap composite price is $64.50.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,511	2,522	2,474	2,250
Ingot Index				
(1947-1949=100)	156.3	157.0	154.0	145.5
Operating Rates				
Chicago	102.0	101.0*	100.0	99.0
Pittsburgh	101.0	102.0*	96.0	100.0
Philadelphia	105.0	103.5	105.0	100.0
Valley	99.0	100.0	100.0	92.0
West	101.0	103.0*	101.0	98.0
Detroit	100.0	104.0	104.0	95.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	104.0	104.0*	103.5	95.0
Birmingham	94.0	94.0	96.0	92.0
S. Ohio River	91.0	96.0*	96.0	90.0
Upper Ohio R.	103.0	104.0*	106.0	100.0
St. Louis	99.0	98.0	100.0	103.0
Northeast	100.0	100.0	100.0	82.0
Aggregate	102.0	102.4	100.5	97.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.622	5.622	5.622	5.174
Pig Iron (Gross Ton)	$63.04	$63.04	$63.04	$59.09
Scrap, No. 1 hvy (gross ton)	$64.50	$65.17	$61.33	$52.17
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	102.875	106.00	112.75	110.00
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

*Revised

Sheet Extras Are Raised

Over-all increase by some major producers amounts to around 3 pct . . . Rising costs are singled out as making move necessary . . . Ferroalloy prices also advance.

◆ RISING COSTS brought a breakthrough on the price front this week as several major producers increased extra charges on hot and cold-rolled sheet.

These adjustments—coupled with stainless steel base price increases made earlier and a raise in ferroalloy prices—indicate that a "hold the line" attitude toward prices is going out of style.

Initial move to revise sheet extras upward was made by Armco Steel Corp. when it raised extras on hot and cold-rolled carbon sheet. The rise amounted to less than 3 pct.

Changes were made in quality and chemistry extras, including an increase in the extra charge for drawing quality-special killed steel. Other changes include an increase in the pickling extra for some sizes of hot-rolled sheets.

For Armco hot-rolled 12 to 15 gage, the width extras went up from $1 per ton to $15-16 per ton. However in 16 gage they rose by $3.00 per ton.

Enameling iron was dropped as much as $3 per ton on products 36 to 48 in. wide.

In making the changes Armco stated, "The newly revised list of extras are more in line with today's cost of producing the various qualities and sizes of these sheet steel products."

Other producers—Jones & Laughlin, National Steel, Granite City Steel—announced similar increases.

J&L raised extras on h-r sheet and c-r sheet from $1 to $8 per ton. The company also set additional extras for hot-rolled alloy steel plates. These apply when cut edges are specified on plates ordered in square or rectangular widths 48 in. or under.

A producer of ferroalloys, Electro Metallurgical Co., Div. of Union Carbide and Carbon Corp.—raised prices effective Dec. 15. Advanced were some manganese and silicon alloys, and all nickel-bearing alloys. Weighted average of the price increases is about 5½ pct. Higher production costs for ore, steel scrap, and nickel, as well as ocean freight charges, were cited as making the increases necessary. (New prices will be found on p. 127.)

On the supply scene this week interest in cold-rolled sheet appeared to be picking up with January order books full and February demand strong. Both hot rolled sheet and strip, in one midwest market at least, were on quota with some carryover into the first quarter. Plate and structural customers in the same area were finding their existing quotas reduced even without the pressures of a shipbuilding program.

SHEET AND STRIP . . . Cold-rolled strip orders from auto and appliance producers in **Cleveland** area have improved in the last few weeks. Orders from smaller customers are following the same trend. Orders from automakers for February tonnages of cold-rolled sheets show an increase of about 5 pct over January's. January, in turn, is better than December. Deferments of cold-rolled sheet have not been as much a factor this month as previously.

At **Detroit** interest and demand in cold-rolled sheet for February seems a little stronger than it was in January. Hot-rolled continues tight.

Similarly, February orders of one **Pittsburgh** producer for c-r sheet are up over January's.

Cold-rolled sheet and strip are strong at **Chicago,** even apart from automotive ordering. Major demand by auto buyers could tighten even the cold-rolled sheet market by end of the first quarter.

PIPE AND TUBING . . . A **Pittsburgh** mill is sold out through first quarter on both oil country goods and mechanical tubing. News that oil men have upped their drilling estimates for next year to 61,000 wells indicates there'll be sustained demand for seamless. On linepipe, mills there are booked solid until 1959.

BARS . . . Hot-rolled bars are still very tight, with **Chicago** indicating carryovers of 2-4 weeks into January. Bookings there are already solid through the first quarter. Cold finished bars are easier, but any real pickup in first quarter would catch producers off guard.

At **Cleveland** hot-rolled bars are booked through the first quarter. Cold finished bars are tightening up.

There's a good demand for forging bars at **Detroit,** with other grades fairly plentiful, especially alloy bars.

Alloy bars at **Philadelphia** are available on 5-week delivery. Hot rolled are very tight.

PLATE AND STRUCTURALS . . . Situation at **Detroit** called "hopeless." Small die shops say they can't even get small pieces of plate from the warehouses.

At **Pittsburgh** there will be extensive carryovers in plate for the first quarter. Production cutbacks and additional demand will put added pressure on supply.

Carryovers on plate and structurals at **Chicago** were reduced in some cases to zero by dropping all carryovers from back in November. On basis of present plate allotments, backlogs are running into 1958. Some tank fabricators have been taking on small tank work where the fabrication is tricky in an effort to keep up their profits. They can't get the plate to book big jobs.

Purchasing Agent's Checklist

Comparison of Prices

(Effective Dec. 18, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Dec. 18 1956	Dec. 11 1956	Nov. 20 1956	Dec. 21 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	47.50	47.50	47.50	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.95	$9.95	$9.95	$9.05
Tinplates, electro (0.50 lb.)	8.65	8.65	8.65	7.75
Special coated mfg. ternes	9.20	9.20	9.20	7.85
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40¾-43¼¢	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
Rails: (per 100 lb.)				
Heavy rails	$5.075	$5.075	$5.075	$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per not ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
Finished Steel Composite: (per pound)				
Base price	5.622¢	5.622¢	5.622¢	5.174¢

	Dec. 18 1956	Dec. 11 1956	Nov. 20 1956	Dec. 21 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$67.76	$67.76	$67.76	$63.69
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.84	62.77
Basic Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb‡ (74 to 76 pct Mn base.)	11¾-12¾¢	11.75¢	11.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$63.04	$63.04	$63.04	$59.09
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$66.50	$66.50	$62.50	$53.50
No. 1 steel, Phila. area	62.50	62.50	58.50	51.50
No. 1 steel, Chicago	*61.50*	66.50	63.00	51.50
No. 1 bundles, Detroit	60.50	60.50	60.50	46.50
Low phos., Youngstown	70.50	70.50	68.50	55.00
No. 1 mach'y cast, Pittsburgh	61.50	61.50	61.50	54.50
No. 1 mach'y cast, Philadel'a	60.50	59.50	58.00	56.50
No. 1 mach'y cast, Chicago	58.50	58.50	58.50	56.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$64.50*	$65.17	$61.33	$52.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.50	$15.50	$15.50	$14.25
Foundry coke, prompt	$18-19	$18-19	$18-19	$16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	40.00	40.00	40.00	43.00
Copper, Lake, Conn.	40.00	40.00	40.00	43.00
Tin, Straits, New York	*102.375*†	106.00	112.75	110.00
Zinc, East St. Louis	13.50	13.50	13.50	13.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Aluminum, virgin ingot	27.10	27.10	27.10	24.40
Nickel, electrolytic	64.50	64.50	64.50	64.50
Magnesium, ingot	36.00	36.00	36.00	33.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 124→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	64.50	65.00	65.50	66.00	.....
Birdsboro, Pa. *B6*	64.50	65.00	65.50	66.00	.....
Birmingham *R3*	58.50	59.00*	.....	.....	.....
Birmingham *W9*	58.50	59.00*	63.00	.....	.....
Birmingham *U4*	58.50	59.00*	63.00	.....	.....
Buffalo *R3*	62.50	63.00	63.50	64.00	.....
Buffalo *H1*	62.50	63.00	63.50	.....	.....
Buffalo *W6*	62.50	63.00	63.50	64.00	.....
Chester *P2*	64.50	65.00	65.50	.....	.....
Chicago *I4*	62.50	63.00	63.00	63.50	.....
Cleveland *A5*	62.50	63.00	63.00	63.50	67.50†
Cleveland *R3*	62.50	63.00	63.00	63.50	.....
Duluth *I4*	62.50	63.00	63.00	63.50	67.50†
Erie *I4*	62.50	63.00	63.00	63.50	67.50†
Everett *M6*	.....	63.75	64.25	.....	.....
Fontana *K1*	70.00	70.50	.....	.....	.....
Geneva, Utah *C7*	62.50	63.00	.....	.....	.....
Granite City *G2*	64.40	64.90	65.40	.....	.....
Hubbard *Y1*	.....	.....	63.00	.....	.....
Lone Star *L3*	58.50‡	59.00‡	.....	.....	.....
Midland *C11*	62.50	.....	.....	.....	.....
Minnequa *C6*	64.50	65.00	65.50	.....	.....
Monessen *P6*	62.50	.....	.....	.....	.....
Neville Is. *P4*	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda *T1*	.....	63.00	63.50	64.00	.....
Pittsburgh *U1*	62.50	.....	63.00	63.50	.....
Sharpsville *S3*	62.50	63.00	63.00	63.50	.....
So. Chicago *R3*	62.50	63.00	63.00	.....	.....
Steelton *B3*	64.50	65.00	65.50	66.00	70.50
Swedeland *A2*	64.50	65.00	65.50	65.50	.....
Toledo *I4*	62.50	63.00	63.00	63.50	.....
Troy, N. Y. *R3*	64.50	65.00	65.50	66.00	.....
Youngstown *Y1*	.....	.....	63.00	63.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo, *H1*, $72.50; Jackson, *J1*, *I4* (Globe Div.), $71.50; Niagara Falls (15.01-15.50), $99.50; Keokuk (14.01-14.50), $102.00; (15.51-16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon: $64.00.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	20.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.35	38.75	41.50	40.75	63.50	48.00	56.25	34.50	31.00	31.50	31.50

Allegheny Ludlum 1¾ to 6c higher on nickel-bearing grades

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pg., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25 per lb higher); New Bedford, Mass., *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

Market Teeters After Drop

Chicago decline marks market crest . . . Trade wonders if market will drop or recover strength . . . Composite drops from all-time high . . . Local conditions figure.

◆ The big question in scrap this week: Is the market teetering on the brink of a sharp drop, or will it strengthen after its current localized decline and resume its climb to new high records.

The decline this week, the first in more than two months, is confined to one major market and an adjacent, sympathetic area. But elsewhere indications of a slightly softening market are reported, although not sufficient to change price structures.

The price break occurred in Chicago, where local mills were able to make purchases below previous prices. This brought the entire list of steelmaking and blast furnace grades down $2 across the board.

On the strength of the Chicago drop, THE IRON AGE Composite Price declined to $64.50, down from last week's all-time high of $65.17. This was the first decline since early fall, when the steady rise began.

Significantly, the Chicago market, where the drop occurred, was less bearish than others that maintained their price levels. The feeling in the Windy City is that the drop is based on strictly local conditions. Brokers continued to pay high prices for out-of-area orders. The new Chicago prices did not involve particularly large tonnages, and significant tonnages of any grade are difficult to obtain.

Elsewhere, the market is marking time; probably will stay relatively quiet until after the holidays. Probably the market will not get a significant test until after the first of the year.

In many market areas, feeling is that prices have reached their limit, that mills will hold out as long as possible before paying higher prices. Orders were difficult to obtain in some areas, but enough was moving at quoted prices to hold the line.

Pittsburgh . . . The market has taken on a tone of weakness, but this has not shown up in sales at lower prices, except in secondary grades. No. 2 bundles have been sold in small quantities for as low as $51. But brokers are still paying the full $66 for No. 1 heavy melting although shipments are light. Feeling is that prices will go down if the mills can stay out of the market. Mills are now reported to be in good shape on inventories.

Chicago . . . A $2 decline in mill buying prices may be a local situation. While out-of-area mills continue to buy at strong prices, local mills are holding to new, lower price levels. Opinion is that the decline may be temporary—also that it does not involve large tonnage of scrap. Prices were high and strong when monthly contracts were let, and the current break may involve smaller orders, since it is not easy to pick up large lots of any grade at current broker prices.

Philadelphia . . . The market retains its status quo on the basis of continued buying of most grades at present prices. Some railroad activity and a cast purchase accounted for the only price changes. Inventories are picking up somewhat, although some mills are still in short supply.

New York . . . Cast grades rose $1 to $2 on the basis of a buy by a major eastern mill for openhearth charge. For steelmaking grades, the market appears to be on a temporary plateau, with no new orders reported.

Detroit . . . Some signs of a softening market are beginning to appear here. A small tonnage of sheet clips was sold here for a price about $5 lower than the last previous sale. Dealer prices remain unchanged on the basis of old orders. No new buying is taking place and there may not be any until lists close later in the month.

Cleveland . . . Small additional tonnages of No. 1 heavy melting were bought by a local mill at the prevailing price of $65.50 for the only significant activity. Prices are firm, with considerable tonnage of No. 2 bundles going to Pittsburgh. Dealers could get about the same price in the Valley, but Pittsburgh mills will take greater tonnages.

Birmingham . . . The domestic market in the South is a little more quiet, with some mills that were reaching out for scrap now contented with the local supply. The export market, however, continues strong, and is reaching farther into the interior. Some recent railroad lists closing in the South reflect a continuing strong market with no lessening in demand for premium items.

St. Louis . . . The market is weaker and some prices are down $2 as a result of the softening market. Receipts continue at a moderate rate, about what the mills need to meet their requirements.

Cincinnati . . . Some slight indications of weakness appeared in this market with dealers offering extra tonnage. But still no sales at lower than present record high prices have been reported. Most buyers have completed shipments for the year and will probably coast through the holiday season. Foundries are still slow in buying, appearing content to work off their inventories.

Buffalo . . . Prices are unchanged, with no new sales made in the past week. The trade believes that prices are about as high as they can go and that mills resist further increases. Dealer inventories are still not building up after the long shortage.

Boston . . . The market is definitely weaker, with No. 1 grades dropping off a full $1. Export is quiet and local mills, for the most part, are now out of the market.

West Coast . . . Mills are getting all the scrap they want, and are taking only what they need to meet requirements. But prices are holding at present levels. Exporting continues active.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING

G. F. Goransson

Type of Bessemer Converter used by Goransson at Edsken, Sweden . . . This is the sixteenth in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1858—The First Marketable Steel

The contribution of the Bessemer process to the manufacture of steel might have been endlessly delayed had it not been for a chance meeting in England in 1857 between Bessemer and Goran Fredrik Goransson, a Swedish merchant.

Intrigued by the process, but disappointed with the quality of the steel produced, Goransson set about to achieve a more malleable product. On the seeming verge of failure, he resolved at the last moment to diminish the air pressure instead of increasing it. For his experiment, he put 12 tuyeres in one line at the bottom of the converter and enlarged their diameters to ⅞ of an inch. This did the trick. The temperature of the fluid steel was raised and the resulting ingots were free from slag and extremely malleable. A short time later, additional experiments resulted in the first successful commercially marketable steel.

Today, the most selective grades of scrap help produce America's finest steel. These special steels require scrap of known analysis. We believe our experience, personnel, equipment, and the strategic location of our offices can best help you solve any problem you may have in iron or steel scrap.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Scrap Prices *(Effective Dec. 18, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$66.00 to $67.00
No. 2 hvy. melting	58.00 to 59.00
No. 1 dealer bundles	66.00 to 67.00
No. 1 factory bundles	74.00 to 75.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	43.00 to 44.00
Mixed bor. and ms. turn.	43.00 to 44.00
Shoveling turnings	48.00 to 49.00
Cast iron borings	48.00 to 49.00
Low phos. punch'gs plate	72.00 to 73.00
Heavy turnings	59.00 to 60.00
No. 1 RR. hvy. melting	71.00 to 72.00
Scrap rails, random lgth.	79.00 to 80.00
Rails 2 ft and under	83.00 to 84.00
RR. steel wheels	75.00 to 76.00
RR. spring steel	75.00 to 76.00
RR. couplers and knuckles	75.00 to 76.00
No. 1 machinery cast	61.00 to 62.00
Cupola cast	54.00 to 55.00
Heavy breakable cast	52.00 to 53.00

Chicago

No. 1 hvy. melting	$64.00 to $65.00
No. 2 hvy. melting	53.00 to 55.00
No. 1 dealer bundles	65.00 to 66.00
No. 1 factory bundles	71.00 to 73.00
No. 2 bundles	49.00 to 50.00
Machine shop turn.	41.00 to 42.00
Mixed bor. and turn.	43.00 to 44.00
Shoveling turnings	43.00 to 44.00
Cast iron borings	43.00 to 44.00
Low phos. forge crops	74.00 to 75.00
Low phos. punch'gs plate	71.00 to 72.00
Low phos. 3 ft and under	69.00 to 70.00
No. 1 RR. hvy. melting	70.00 to 72.00
Scrap rails, random lgth.	82.00 to 83.00
Rerolling rails	93.00 to 95.00
Rails 2 ft and under	90.00 to 91.00
Locomotive tires, cut	74.00 to 75.00
Cut bolsters & side frames	74.00 to 75.00
Angles and splice bars	79.00 to 80.00
RR. steel car axles	93.00 to 94.00
RR. couplers and knuckles	73.00 to 74.00
No. 1 machinery cast	58.00 to 59.00
Cupola cast	53.00 to 54.00
Heavy breakable cast	51.00 to 52.00
Cast iron brake shoe	50.00 to 51.00
Cast iron wheels	58.00 to 60.00
Malleable	73.00 to 74.00
Stove plate	50.00 to 51.00
Steel car wheels	74.00 to 75.00

Philadelphia Area

No. 1 hvy. melting	$62.00 to $63.00
No. 2 hvy. melting	53.00 to 54.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	45.00 to 46.00
Mixed bor. short turn.	45.00 to 46.00
Cast iron borings	45.00 to 46.00
Shoveling turnings	48.00 to 49.00
Clean cast chem. borings	51.00 to 52.00
Low phos. 5 ft and under	67.00 to 68.00
Low phos. 2 ft and under	69.00 to 70.00
Low phos. punch'gs	69.00 to 70.00
Elec. furnace bundles	64.00 to 65.00
Heavy turnings	58.00 to 59.00
RR. steel wheels	73.00 to 74.00
RR. spring steel	73.00 to 74.00
Rails 18 in. and under	81.00 to 82.00
Cupola cast	55.00 to 56.00
Heavy breakable cast	58.00 to 59.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	44.00 to 45.00
No. 1 machinery cast	60.00 to 61.00

Cleveland

No. 1 hvy. melting	$64.50 to $65.50
No. 2 hvy. melting	55.00 to 56.00
No. 1 dealer bundles	64.50 to 65.50
No. 1 factory bundles	71.00 to 72.00
No. 2 bundles	46.00 to 47.00
No. 1 busheling	64.50 to 65.50
Machine shop turn.	35.00 to 36.00
Mixed bor. and turn.	39.00 to 40.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Cut struct'r'l & plates, 2 ft. & under	68.50 to 69.50
Drop forge flashings	65.50 to 66.50
Low phos. punch'gs, plate	65.50 to 66.50
Foundry steel, 2 ft & under	61.00 to 62.00
No. 1 RR. heavy melting	70.00 to 71.00
Rails 2 ft and under	84.00 to 85.00
Rails 18 in. and under	85.00 to 86.00
Railroad grate bars	49.00 to 50.00
Steel axle turnings	44.00 to 45.00
Railroad cast	61.00 to 62.00
No. 1 machinery cast	60.00 to 61.00
Stove plate	54.00 to 55.00
Malleable	71.00 to 72.00

Youngstown

No. 1 hvy. melting	$67.00 to $68.00
No. 2 hvy. melting	59.00 to 60.00
No. 1 dealer bundles	67.00 to 68.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	35.00 to 36.00
Shoveling turnings	41.00 to 42.00
Cast iron borings	40.00 to 41.00
Low phos. plate	70.00 to 71.00

Buffalo

No. 1 hvy. melting	$60.00 to $61.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 busheling	60.00 to 61.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	34.00 to 35.00
Mixed bor. and turn.	38.00 to 39.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	35.00 to 36.00
Low phos. plate	65.00 to 66.00
Scrap rails, random lgth.	63.00 to 64.00
Rails 2 ft and under	79.00 to 80.00
RR. steel wheels	65.00 to 66.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	74.00 to 75.00
No. 1 machinery cast	54.00 to 55.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$59.00 to $60.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	40.00 to 41.00
New busheling	59.00 to 60.00
Drop forge flashings	58.50 to 59.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	59.00 to 60.00
No. 1 cupola cast	51.00 to 52.00
Heavy breakable cast	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$55.00 to $57.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	58.00 to 59.00
No. 2 bundles	44.00 to 45.00
Machine shop turn.	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Shoveling turnings	40.00 to 41.00
No. 1 RR. hvy. melting	66.00 to 67.00
Rails, random lengths	80.00 to 81.00
Rails 18 in. and under	86.00 to 87.00
Locomotive tires uncut	68.00 to 69.00
Angles and splice bars	70.00 to 71.00
Std. steel car axles	85.00 to 86.00
RR. specialties	70.00 to 71.00
Cupola cast	51.00
Heavy breakable cast	46.50 to 47.50
Cast iron brake shoes	54.00 to 55.00
Stove plate	44.00 to 45.00
Cast iron car wheels	56.00 to 57.00
Rerolling rails	87.00 to 88.00
Unstripped motor blocks	45.50 to 46.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	53.00 to 54.00
No. 2 bundles	40.50 to 41.50
No. 1 busheling	53.00 to 54.00
Elec. furnace, 3 ft & under	56.00 to 57.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and short turn.	34.00 to 35.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	37.00 to 38.00
No. 1 machinery cast	47.00 to 48.00
Mixed cupola cast	43.00 to 44.00
Heavy breakable cast	45.00 to 46.00
Stove plate	41.00 to 42.00
Unstripped motor blocks	33.00 to 34.00

New York

Brokers buying prices per gross ton, on cars

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	49.00 to 50.00
No. 2 dealer bundles	47.00 to 48.00
Machine shop turn.	37.00 to 38.00
Mixed bor. and turn.	41.00 to 42.00
Shoveling turnings	42.00 to 43.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast	54.00 to 55.00
Mixed yard cast	48.00 to 49.00
Charging box cast	52.00 to 53.00
Heavy breakable cast	52.00 to 53.00
Unstripped motor blocks	41.00 to 42.00

Birmingham

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	39.00 to 40.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	56.00 to 57.00
Bar crops and plate	64.00 to 65.00
Structural and plate, 2 ft	63.00 to 64.00
No. 1 RR. hvy. melting	63.00 to 64.00
Scrap rails, random lgth.	76.00 to 77.00
Rails, 18 in. and under	76.00 to 77.00
Angles & splice bars	68.00 to 69.00
Rerolling rails	82.00 to 83.00
No. 1 cupola cast	52.00 to 53.00
Stove plate	51.00 to 52.00
Charging box cast	40.00 to 41.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	44.00 to 45.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	54.00 to 55.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$62.00 to $63.00
No. 2 hvy. melting	52.00 to 53.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	46.00 to 47.00
Machine shop turn.	41.00 to 42.00
Mixed bor. and turn.	40.00 to 41.00
Shoveling turnings	43.00 to 44.00
Cast iron borings	40.00 to 41.00
Low phos. 18 in. & under	69.00 to 70.00
Rails, random lengths	76.00 to 77.00
Rails, 18 in. and under	82.00 to 83.00
No. 1 cupola cast	48.00 to 49.00
Hvy. breakable cast	47.00 to 48.00
Drop broken cast	59.00 to 60.00

San Francisco

No. 1 hvy. melting	$55.00
No. 2 hvy. melting	52.00
No. 1 dealer bundles	54.00
No. 2 bundles	40.00
Machine shop turn.	35.00
Cast iron borings	35.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast	57.00

Los Angeles

No. 1 hvy. melting	$54.00
No. 2 hvy. melting	52.00
No. 1 dealer bundles	53.00
No. 2 bundles	38.00
Machine shop turn.	35.00
Shoveling turnings	38.00
Cast iron borings	35.00
Elec. furn. 1 ft. and under (foundry)	66.00
No. 1 RR. hvy. melting	54.00
No. 1 cupola cast	56.00

Seattle

No. 1 hvy. melting	$54.00
No. 2 hvy. melting	51.00
No. 2 bundles	$33.00 to 35.00
No. 1 cupola cast	55.00
Mixed yard cast	55.00

Hamilton, Ont.

No. 1 hvy. melting	$54.00
No. 2 hvy. melting	47.00
No. 1 dealer bundles	54.00
No. 2 bundles	40.50
Mixed steel scrap	46.00
Bushelings	39.50
Bush., new fact., prep'd.	52.00
Bush., new fact., unprep'd.	48.00
Machine shop turn.	31.00
Short steel turn.	35.00
Mixed bor. and turn.	28.00
Rails, rerolling	60.00
Cast scrap	50.00

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GSA Forced To Take Aluminum

Kaiser selling stockpile 20 million lbs . . . Government doesn't want the metal . . . Defense Production Act contracts leave no choice . . . Alcoa, Reynolds won't follow.

◆ KAISER Aluminum is selling 20 million lb of aluminum to the government. This transaction is unusual because (1) the amount is smaller than usually offered (and insignificant as far as affecting market conditions) and (2) General Services Administration, agency involved, doesn't want the metal.

Minimum aluminum stockpile requirement is just about satisfied. And the government has already announced that it would not take any aluminum during the first half of 1957.

Kaiser reports the metal is being offered so that it can make some "adjustments" in its production and stocks. Interpreted, this means that the company is attempting to set up a pattern of procedure should future offering of more sizable tonnages be deemed necessary.

GSA has no choice but to accept. Under the terms of its Defense Production Act expansion program contracts with the Big Three aluminum producers, the government agrees to buy excess metal produced as a result of certain expansion programs. This metal must be over and above Defense or Atomic Energy Commission requirements, and must first be offered to nonintegrated fabricators. Government agrees to pay the market price.

Evidently Kaiser is succeeding. GSA is not objecting, will buy the aluminum and tell Kaiser where to ship the metal with no further official comment.

At present, the other aluminum companies affected by the precedent say they will not follow suit. Both Aluminum Co. of America and Reynolds Metals Co. will attempt to sell all their metal on the commercial market. But there is good reason to believe that the companies might change their positions should production continue to pull away from demand.

Reynolds is already advertising primary aluminum pig, ingot, and billet "to any manufacturer, fabricator, finisher and producer in the U. S. who is not a producer of primary aluminum or an affiliate or subsidiary of such a producer." It specifically states that the aluminum is offered "pursuant to certain contracts with the U. S. Government."

Presumably this would help to establish Reynolds' compliance with the contract should the company change its mind and follow the Kaiser precedent.

ALUMINUM . . . The Aluminum Assn. reports production of primary metal through November totaled 1,530,856 short tons. This tops every other full year's output except 1955. It is so close to total production for last year that the question is only how much will it surpass 1955. This will be the fifth consecutive year in which primary producers have established a new high.

Looking ahead, Frank R. Nichols, president, Nichols Wire & Aluminum Co., Davenport, Iowa, says 1957 also will be a record making year in sales of aluminum building materials.

Mr. Nichols says that this will not be altered by any relatively slight decrease in housing starts. The reason: consumption of aluminum building materials per construction unit is steadily rising.

COPPER . . . The Copper Institute reports that refined production, both U. S. and foreign, was off in November from the previous month. World refineries turned out 254,077 tons of metal in November, 132,970 in the U. S.

On the other hand, deliveries to fabricators were up; 240,426 tons world-wide in November, compared to 234,080 in October. Biggest gain was registered outside the U. S. where deliveries were up to 125,902 tons from 120,727 tons. Gain in November over October domestically was slight, 114,524 — November; 113,353 — October.

However, in a market where supply has exceeded demand, this is considered a step in the right direction. Combined with an expected increase in activity from brass mills, it is grounds for at least some degree of optimism.

SCRAP . . . "While 1956 has been a relatively satisfactory year for the secondary metal industry in terms of tonnage, it has not been as profitable as was 1955."

This is the way Carl J. Gross, Federated Metals Div., American Smelting and Refining Co.; also president of the Secondary Metal Institute, National Assn. of Waste Material Dealers, Inc., sees the situation. The reasons: higher costs of labor, and more active competition.

Mr. Gross considers the outlook for 1957 bright in terms of demand, but points to the troubled world situation as a possible hitch in profitable operations. The reason: a confused world situation will cause higher costs and more fluctuation in nonferrous metal markets.

Tin Prices for the week: Dec. 12—104.00; Dec. 13—104.50; Dec. 14—104.25; Dec. 17—103.00; Dec. 18—102.875.*

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	38.00	40.00	10/26/56
Copper (CS)	35.75	38.00	11/24/56
Copper (L)	38.00	40.00	10/27/56
Lead, E. St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	33.25	33.75	8/13/56
Nickel	74.00	64.50	12/8/56
Titanium sponge	250-275	270-300	12/4/56
Zinc, E. St. L.	13.50	13.00	1/6/56
Zinc, N. Y.	14.00	13.50	1/6/56

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see column at right, other primary prices, pg. 120.

Nonferrous Prices *(Effective Dec. 18, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1800, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061–0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6– 8	45.5–47.3	61.3–65.1
12–14	46.2–47.7	62.2–66.8
24–26	49.4–49.5	73.1–77.8
36–38	58.3–59.0	97.4–101.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜–⅝	¾–1	1¼–1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250–3.00	.250–2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	113	97	118
Strip, CR	111	99	128
Rod, bar, HR	94	80	99
Angles, HR	94	80	99
Plates, HR	107	96	111
Seamless tube	144	120	190
Shot, blocks	...	78	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	58.13	.....	55.36	58.32
Brass, 70/30	50.19	50.73	50.13	53.10
Brass, Low	53.40	53.94	53.34	56.21
Brass, R L	54.54	55.08	54.48	57.35
Brass, Naval	54.14	.....	48.45	57.55
Munts Metal	52.19	.....	48.00	.....
Comm. Bz.	56.23	56.77	56.17	58.75
Mang. Bz.	57.88	.....	51.98	.....
Phos. Bz. 5%	77.25	.....	77.25	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure, $9.25-$9.75; alloy, $11.25. Wire, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.05.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex. ... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis.... $ 1.31
Cobalt, 97-99% (per lb).... $2.35 to $2.42
Germanium, per gm, f.o.b. Miami, Okla., refined $48.50
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz... $ 2.25
Iridium, dollars per troy oz.... $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz.. $23 to $24
Platinum, dollars per troy oz..$103 to $105
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg $43.00
Uranium, normal per kg $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 35.00
No. 120 ..... 33.75
No. 123 ..... 32.25
80-10-10 ingot
No. 305 ..... 38.50
No. 315 ..... 36.75
88-10-2 ingot
No. 210 ..... 48.75
No. 215 ..... 44.50
No. 245 ..... 40.00
Yellow Ingot
No. 405 ..... 27.50
Manganese bronze
No. 421 ..... 30.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 26.25-27.00
0.60 copper max. 26.00-26.75
Piston alloys (No. 122 type)..26.00-26.75
No. 12 alum. (No. 2 grade)....23.75-25.00
108 alloy 24.00-25.00
195 alloy 26.50-27.00
13 alloy (0.60 copper max.)...26.00-26.75
AXS-679 ..... 24.00-25.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 24.00-25.50
Grade 2—92-95% 23.25-24.50
Grade 3—90-92% 22.50-23.75
Grade 4—85-90% 21.75-22.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	32	31¼
Yellow brass	24⅝	22⅝
Red brass	28½	27¾
Comm. bronze	29½	28¾
Mang. bronze	23½	22½
Yellow brass rod ends	24⅝	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 30¾
No. 2 copper wire 29¼
Light copper 27
*Refinery brass 27¾
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 30¾
No. 2 copper wire 29¼
Light copper 27
No. 1 composition 27½
No. 1 comp. turnings 27
Hvy. yellow brass solids..... 20½
Brass pipe 20½
Radiators 22
Aluminum
Mixed old cast. ..... 16½—17½
Mixed new clips ..... 17 —18
Mixed turnings, dry ..... 16½—17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 27½—28
No. 2 copper wire ..... 26 —26½
Light copper ..... 24½—25
Auto radiators (unsweated).. 17½—18
No. 1 composition ..... 24 —24½
No. 1 composition turnings... 22½—23
Cocks and faucets ..... 18½—19
Clean heavy yellow brass.... 16 —16½
Brass pipe ..... 19 —19½
New soft brass clippings..... 21 —21½
No. 1 brass rod turnings..... 18 —18½

Aluminum

Alum. pistons and struts..... 6½— 7
Aluminum crankcases ..... 12 —12½
1100 (2S) aluminum clippings 15 —15½
Old sheet and utensils ..... 12 —12½
Borings and turnings ..... 8 — 8½
Industrial castings ..... 12 —12½
2024 (24S) clippings ..... 13½—14

Zinc

New zinc clippings ..... 7 — 7½
Old zinc ..... 4½— 5
Zinc routings ..... 2¾— 3
Old die cast scrap ..... 2½— 2¾

Nickel and Monel

Pure nickel clippings..... $1.75-$1.85
Clean nickel turnings ..... $1.50-$1.60
Nickel anodes ..... $1.75-$1.85
Nickel rod ends ..... $1.75-$1.85
New Monel clippings 75-80
Clean Monel turnings 70-75
Old sheet Monel 70-80
Nickel silver clippings, mixed 21
Nickel silver turnings, mixed 18

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid free 4½

Miscellaneous

Block tin ..... 80 —81
No. 1 pewter ..... 62½—63
Auto babbitt ..... 42 —42½
Mixed common babbitt ..... 13 —13½
Solder joints ..... 18 —18½
Siphon tops 42
Small foundry type ..... 15¼—15½
Monotype ..... 14½—15
Lino. and stereotype ..... 13 —13½
Electrotype ..... 12½—12¾
Hand picked type shells ..... 10 —10½
Lino. and stereo. dross ..... 5¼— 5¾
Electro. dross ..... 4¼— 4½

IRON AGE

STEEL PRICES

(Effective Dec. 18, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.40 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1, W8*	7.35 *U1,Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1,T8*			7.75 *W8 S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J3*			7.75 *J3*	
	Detroit, Mich.	$74.00 *R5*		$107.00 *R5*					4.775 *G3, M2*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, D2*	7.05 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.00 *I3*	4.675 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*							4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *N5*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1, J3*	$91.50 *U1, J3,C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	6.750 *P6* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*		5.00 *Y1*	7.35 *Y1*		4.675 *U1, Y1*	6.85 *Y1,C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.70 *K1*	8.05 *K1*	5.85 *K1*	5.475 *K1*	8.60 *K1*				
	Geneva, Utah	$91.50 *C7*				5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.00 *C1*			8.05 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7,B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2,R3* 5.30 *C16*	7.35 *T2*		4.675 *T2,R3* 4.975 *C10*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.30 *S2*			

STEEL PRICES

(Effective Dec. 18, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price, Can-making quality blackplate 55 to 128 lb. deduct .2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymond, Del.													
	Contoeville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.80 *U1*	$8.50 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.80 *B3*		
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8, K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.70 *U1, Y1*	$8.40 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.50 *G2*	7.25 *G3*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.40 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.70 *J3, U1*	$8.40 *U1*	7.15 *U1*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.70 *W5*	$8.40 *W5*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			7.15 *Y1*
WEST	Fontana, Cal.	5.475 *K1*	6.95 *K1*				7.70 *K1*	9.725 *K1*				$10.45 *K1*	$9.15 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.45 *C7*	$10.45 *C7*	$9.15 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	5.75 *T2,*	6.30 *T2, R3*							5.80 *T2,R3*	$9.80 *T2*	$8.50 *T2*	
	Houston, Tex.										6.05 *S2*			

IRON AGE

STEEL PRICES

(Effective Dec. 18, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfrs. Bright
EAST	Bethlehem				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.35 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.90 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.00 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.325 *A5* 8.625 *B5*						7.50 *A5,W6* 9.825 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,N5*		6.85 *N5*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.575 *P13*	5.075 *U1,R3, N4* 5.575 *P13*	6.85 *A5,B5, W10,L2 W8,L2,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2, R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.525 *N4*	5.175 *N4*									7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3, R3, S9, B4,W10*	6.125 *U1,C11*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.55 *K1*		7.55 *K1*	7.95 *K1*	
	Geneva, Utah	5.175 *C7*						4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.10 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburgh, Cal.	5.775 *C7,P9* 5.825 *B2*	5.775 *C7,P9* 5.825 *B2*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2* 5.825 *N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.575 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.375 *C16*	5.075 *T2,R3* 5.375 *C16*				7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

† Merchant Quality—Specialty Quality .35¢ higher.

Steel Prices *(Effective Dec. 18, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston Div., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Stee Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Youngstown *R3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Fontana *K1*	0.00	+15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75								
Pittsburgh *J3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Alton, Ill. *L1*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Sharon *M3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Fairless *N2*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Pittsburgh *N1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Wheeling *W5*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Wheatland *W4*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Youngstown *Y1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Indiana Harbor *Y1*	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75								
Lorain *N2*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Youngstown *R3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Fairless *N2*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Fontana *K1*	4.50		8.50		10.50		11.00		11.50		12.00		12.50									
Pittsburgh *J3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Alton, Ill. *L1*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Sharon *M3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Pittsburgh *N1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Wheeling *W5*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Wheatland *W4*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Youngstown *Y1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Indiana Harbor *Y1*	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75								
Lorain *N2*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½" and 3" pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	2	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium.. .83 D-3, D-5
Oil hardened manganese .45 O-2
Special carbon .41 W-1
Extra carbon .345 W-1
Regular carbon .29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				33.25
	304	34.60	38.00	41.50	35.25
	316	39.70	43.20	46.65	52.25
	321	36.35	39.80	43.50	42.80
	347	39.50	43.95	48.45	51.00
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 40.65; 1 side, 33.40.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	9.00	9.20	
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

* Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*) Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% *Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.*

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	195	187	8.10	8.50
Aliquippa, Pa. *J3****	164	179		181	7.95	8.475
Atlanta *A8***	166	182	192	190	8.05	8.65
Bartonville *K2***	166	182	192	190	8.05	8.65
Buffalo *W6*					8.10	8.50
Chicago, Ill. *N4***	164	180	167	190	188 7.95	8.55
Cleveland *A6*	173				8.10	
Cleveland *A5*					7.95	
Crawfordsville *M4***	166	182	192	190	8.05	8.65
Donora, Pa. *A5*	164	176	190	184	7.95	8.35
Duluth *A5*	164	176	190	184	7.95	8.35
Fairfield, Ala. *T2*	164	176	190	184	7.95	8.35
Galveston *D4*	181					
Houston *S2*	169	181	195	189	8.20	8.60
Johnstown, Pa. *B3***.	164	180	167	188	7.95	8.55
Joliet, Ill. *A5*	164	176	190	184	7.95	8.35
Kokomo, Ind. *C9**	166	178	192	186	8.05	8.45
Los Angeles *B2***					8.90	9.50
Kansas City *S2**	169	181	195	189	8.20	8.60
Minnequa *C6*†	169	181	172 195	189	8.20	8.60
Monessen *P6*	167	185		191	8.10	8.10
Pittsburg, Cal. *C7*	186	199		204	8.90	9.30
Portsmouth *P7*					8.10	
Rankin, Pa. *A5*	164	176		184	7.95	8.35
So. Chicago *R3*	167	181	195	187	8.10	8.50
S. San Francisco *C6*			214		8.90	9.30
Sparrows Pt. *B3***	166		192	190	8.05	8.65
Struthers, O. *Y1**					7.95	8.45
Worcester *A5*	170				8.25	8.65
Williamsport, Pa. *S5*			175			

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.
*** .10¢ zinc.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery ‡ Charge	Sheets: Hot-Rolled 18 ga. & hvr.	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.87	9.27	9.83	8.16	.....	8.40	8.44	8.30	10.14	.....	.....	.....	.....
Baltimore	$.10	7.79	8.99	9.12	8.27	.....	8.12	8.57	8.34	9.09	14.99	14.44	18.39	18.09
Birmingham	.15	7.68	8.88	8.85	7.78	.....	8.01	8.05	7.91	10.04	.....	.....	.....	.....
Boston	.10	8.70–8.80	9.73–9.83	11.02	8.79–8.89	.....	8.98–9.08	8.90–9.00	8.88–8.98	10.71–10.81	15.05	14.45	18.51	18.10
Buffalo	.15	7.90	9.05	10.87	8.15	.....	8.40	8.40	8.15	8.85	15.00	14.45	18.40	.....
Chicago	.15	7.70–7.85	8.90–9.05	9.70	7.78–7.93	.....	8.01–8.16	8.05–8.20	7.91–8.06	8.35–8.50	14.65	14.10	18.05	17.75
Cincinnati	.15	7.97	9.04	9.90	8.21	.....	8.49	8.70	8.34	8.97	14.93	14.38	18.33	18.03
Cleveland	.15	7.68	8.88	9.60	7.88	.....	8.21	8.38	7.99	8.60	14.73	14.18	18.13	17.83
Denver		9.55	11.09	12.41	9.70	.....	9.80	9.60	9.75	10.54	.....	.....	.....	19.79
Detroit	.15	8.06	9.28	10.17	8.25	.....	8.48	8.70	8.33	8.83	.....	14.04	.....	17.09
Houston		8.70	9.65	.....	8.80	.....	8.60	8.90	8.95	10.55	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	.....	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	8.90	10.65	11.65	9.10	.....	9.35	8.95	8.80	11.70	15.85	15.35	19.70	19.45
Memphis	.15	8.02	9.22	.....	8.12	.....	8.35	8.39	8.25	9.85	.....	.....	.....	.....
Milwaukee	.15	7.82	9.02	9.82	7.90	.....	8.13	8.24	8.03	8.57	14.77	.....	18.17	17.87
New York	.10	8.45	9.63	10.33	8.91	.....	8.85	8.84	8.93	10.71	15.02	14.47	18.42	18.12
Norfolk	.20	8.00	.....	.....	8.40	.....	8.35	8.70	8.45	10.70	.....	.....	.....	.....
Philadelphia	.10	7.89–7.99	9.08–9.18	9.66–10.22	8.58–8.68	.....	8.28–8.38	8.38–8.48	8.37–8.47	9.12–9.22	14.80	14.15–14.25	18.20	17.90
Pittsburgh	.15	7.68	8.88	10.05	7.88	.....	8.01	8.20	7.91	8.60	14.65	13.80–14.10	18.05	16.85–17.75
Portland		8.90	9.65	11.40	9.05	.....	8.70	8.90	8.95	13.55	16.70	16.10	20.40	20.25
San Francisco	.10	8.75	10.30	10.80	8.95	.....	8.85	8.85	8.80	12.30	15.85	15.35	19.70	19.45
Seattle		9.35	10.45	11.55	9.50	.....	9.05	9.15	9.30	13.15	16.10	15.55	19.50	19.20
St. Louis	.15	8.02–8.17	9.21–9.49†	10.03–10.18	8.11–8.26	.....	8.34–8.49	8.48–8.63	8.25–8.40	8.93–9.08	14.83–14.98	14.28	18.23–18.38	17.93
St. Paul	.15	8.29	9.64	10.31	8.39	.....	8.71	8.75	8.52	9.21	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
** F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Baltimore, Md. *T8*	8.25	10.10	12.90	15.30	18.25
Bristol, Conn. *W12*			12.90	15.30	18.25
Boston *T8*	8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. *R7*	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. *S9*	‡	9.80	12.60	15.00	.....
Cleveland *A5*	7.95	9.80	12.60	15.00	17.95
Detroit *D1*	8.05	9.90	12.10	15.10	.....
Detroit *D2*	8.05	9.90	12.10	.....	.....
Dover, O. *G4*	7.95	9.80	12.60	15.00	17.95
Franklin Park, Ill. *T8*	8.05	9.80	12.60	15.00	17.95
Harrison, N. J. *C11*	.....	.....	12.90	15.30	18.25
Indianapolis *C5*	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. *B4*	7.95	9.80	12.60	15.00	.....
New Haven, Conn. *D1*	8.40	10.10	12.30	15.30	.....
Pawtucket, R. I. *N7*	8.50	10.10	12.90	15.30	18.25
Pittsburgh *S7*	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. *A1*	8.05	9.80	12.60	15.00	17.95
Sharon, Pa. *S1*	7.95	9.80	12.60	15.00	17.95
Trenton *R4*	.....	10.10	12.90	15.30	18.25
Wallingford *W1*	8.40	10.10	12.90	15.30	18.15
Warren, Ohio *T4*	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. *W3*	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. *A5*	8.50	10.10	12.90	15.30	18.25
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
National Tube	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	33.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
Pittsburgh Steel	2	13	34.88	40.85	.....	.....
	2½	12	46.98	55.01	.....	.....
	3	12	54.24	63.53	.....	.....
	3½	11	63.32	74.16	.....	.....
	4	10	84.09	98.47	.....	.....

(Effective Dec. 18, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.075	6.00	6.35	....	....	....	....
So. Chicago *R3*	....	....	....	8.775	....	....	....
Ensley *T2*	5.075	6.00	....	....	....	....	....
Fairfield *T2*	....	6.00	....	8.775	....	6.025	....
Gary *U1*	5.075	6.00	....	....	....	6.025	....
Ind. Harbor *I3*	5.075	....	6.35	8.775	....	6.025	....
Ind. Harbor *Y1*	....	....	....	8.775	....	....	....
Johnstown *B3*	....	6.00	....	....	....	....	....
Joliet *U1*	5.075	....	6.35	....	....	....	....
Kansas City *S2*	....	....	....	8.775	....	....	....
Lackawanna *B3*	5.075	6.00	6.35	....	....	6.025	....
Lebanon *B3*	....	....	....	....	....	....	13.10
Minnequa *C6*	5.075	6.50	6.35	8.775	....	6.025	13.10
Pittsburgh *P5*	....	....	....	8.775	12.85	....	....
Pittsburgh *J3*	....	....	....	8.775	....	....	13.10
Seattle *B2*	....	....	....	9.275	....	6.175	13.16
Steelton *B3*	5.075	....	6.35	....	....	6.025	13.10
Struthers *Y1*	....	....	....	8.775	....	....	....
Torrence *C7*	....	....	....	....	....	....	....
Williamsport *S5*	....	6.15	....	....	....	....	....
Youngstown *R3*	....	....	....	8.775	....	....	....

COKE

Furnace, beehive (f.o.b oven) Net-Ton
Connellsville, Pa. ..... $15.25 to $15.75
Foundry, beehive (f.o.b. oven)
$18.00 to $19.00

Foundry oven coke

Buffalo, del'd	$30.75
Detroit, f.o.b.	29.50
New England, del'd	30.55
Seaboard, N. J., f.o.b.	28.75
Philadelphia, f.o.b.	28.50
Swedesland, Pa., f.o.b.	28.50
Painesville, Ohio, f.o.b.	29.50
Erie, Pa., f.o.b.	29.50
Cleveland, del'd	31.55
Cincinnati, del'd	28.59
St. Paul, f.o.b.	28.50
St. Louis, f.o.b.	30.50
Birmingham, f.o.b.	27.60
Milwaukee, f.o.b.	29.50
Lone Star, f.o.b.	25.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

*Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 57.42
Electrodeposited 45.28
Brass, 80-20, ball anodes, 2000 lb or more 58.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon... 90.50
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical. $1.10 to $1.16

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 80.50
Copper sulphate, 5 or more 100 lb bags, per cwt. 20.65
Nickel salts, single, 100 lb bags.... 38.25
Nickel chloride, freight allowed, 300 lb 43.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 21.55
(Philadelphia price 21.80)
Zinc cyanide, 100 to 900 lb..... 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100 lb drums 29.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
		Pct Discounts		
½" and smaller x 6" and shorter	55	58½	60½	61½
⅝" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
¾ in. or smaller	63
⅞ in. to 1 in. inclusive	59½
1⅛ in. to 1½ in. inclusive	64
1⅝ in. and larger	58
C.P. Hex regular & hvy.	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58
Hot Galv. Nuts (All Types)	
¾" and smaller	50
Semi-finished Hex Nuts	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅛ in. and larger	58
(Add 25 pct for broken case or keg quantities)	
Finished	
1" and smaller	65

Rivets

Base per 100 lb
½ in. and larger $10.85
Pct Off List
7/16 in. and smaller 26½

Cap Screws

	Discount (Packages) Bright Treated	H. C. Heat
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	47	34
¾", ⅞" and 1" diam. x 6" and shorter	31	13
⅝" diam. and smaller x longer than 6"	18½	+ 1
¾", ⅞" and 1" diam. & longer than 6"	5½	+19½

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	47	63
¾" through 1" dia. x 6" and shorter	31	51½

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Quantity	Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk			
To ⅛" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In cartons		16	19
In Bulk			
⅝" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.4
Chicago	133.4
San Francisco-L. A.	140.2

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$128.00
No. 1 Ohio	128.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	20.00
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$140.00
Childs, Hays, Pa.	145.00
Chicago District	150.00
Western Utah	144.00-165.00
California	170.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	150.00-157.00
Silica cement, net ton, bulk, Latrobe	26.50
Silica cement, net ton, bulk, Chicago	24.00
Silica cement, net tons, bulk, Ensley, Ala.	25.50
Silica cement, net ton, bulk, Mt. Union	23.00
Silica cement, net ton, bulk, Utah and Calif.	35.00

Chrome Brick	*Per net ton*
Standard chemically bonded, Balt.	$98.00
Standards chemically bonded, Curtiner, Calif.	108.00
Burned, Balt.	92.00
Magnesite Brick	
Standard, Baltimore	$121.00
Chemically bonded, Baltimore	109.00

Grain Magnesite St. ⅜ to ½-in. grains	
Domestic, f.o.b. Baltimore in bulk	$69.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	43.00
in sacks	49.00

Dead Burned Dolomite	*Per net ton*
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carloads lots	8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 99.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	49.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.35 to $3.85
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.20
Zinc, 10 ton lots	18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Dec. 18, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C ...	41.50	0.20% C ...	38.50
0.03% C ...	41.00	0.50% C ...	38.25
0.06% C ...	39.50	1.00% C ...	37.50
0.10% C ...	39.00	1.50% C ...	37.35
0.15% C ...	38.75	2.00% C ...	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si ... 35.75
8.50% max. C, 50-55% Cr, 3-6% Si.. 24.00
8.50% C, 50-55% Cr, 3% max Si.... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe..	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed.....	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	11.75
Sheridan, Pa.	11.75
Philo, Ohio	11.75
S. Duquesne	11.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$97.50
19 to 21%	3% max.	99.50
21 to 23%	3% max.	102.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si....	28.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	13.80
Ton lots	15.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet.....	15.10
Ton lots, packed	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe ...	23.95	22.65
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si ...	13.90	75% Si ...	16.80
65% Si ...	15.65	85% Si ...	18.50
	90% Si ...	19.90	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo. $1.28

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.95

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $215.00

Ferrotungsten, ¼ x down, packed, per pounds contained W, ton lots delivered $3.15

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.32
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump.....	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots, per pound.....	45¢
Less ton lots, per pound....	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots per pound..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.... 1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B.	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.48
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $1.95

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

'Tis the Season . . . A holiday lull has hit most types of used and rebuilt machinery in Pittsburgh. Inquiries are holding up fairly well but purchases have dropped off sharply.

Rolling mill equipment is in this class. Heavy rolling mills are turning up more frequently than in past months and there is plenty of interest but buyers are hesitant about closing deals.

The feeling seems to be that the steel mills have used up their 1956 appropriations and will be doing little purchasing until after the first of next year.

Widespread Shortage . . . Situation is similar for press brakes, large shears, roll grinders and hammers. Sales are off a little. But for these items, it's still more difficult to buy than to sell. On press brakes and lighter shears, one dealer says the supply situation has reached the point where it is hardly worthwhile trying to acquire stock. The shortage is so widespread that any dealer with an acceptable piece of equipment will have his own buyers lined up.

The Hunt is On . . . On machine tools, the lull in buying is expected to extend through the first half of January. Lathes and drills are the tightest items. Milling machines and grinders are more plentiful.

But all types of recent equipment are tough to find. Very few models after 1942 are turning up. And when something recent does appear, dealers will be asked to take a whole plant, including a lot of equipment 50 years old.

Sales of motor generators, motors, mill controls are off 30-40 pct, according to one dealer. About 85 pct of these electrical items normally go to the steel mills and the mills have apparently done their buying for the year.

Electrical Equipment Available . . . There is no shortage of electrical equipment at this time. One dealer says he is overstocked and he expects little new business until after the first of the year.

Cranes are sharing in the general slowdown but one dealer reports sales of one 15 ton model and one 7½ ton. However, the buyers are holding up delivery until after the first of the year.

With the exception of gantry cranes, inquiries are coming in at a good rate. Biggest demand is for units with spans of 60 to 70 ft. Most popular capacities are 10 tons first, then 5 tons and 20 tons after that. Trend is toward models that can be adapted to automatic control.

Crane Prices Up . . . Prices of used cranes are edging upward. In part this may be the result of added margins demanded by handlers. But also the market is feeling the effects of lengthening deliveries of new cranes. Minimum delivery time is six months. In some cases users cannot wait for new models. They are coming into the used crane market and putting pressure on prices.

News from Northwest . . . And in Seattle, the excellent state of Boeing Airplane Co.'s economic health is exercising a profound influence over the area's machinery supply and demand.

Boeing, one of Washington State's largest industrial enterprises, buys for itself almost no used equipment. An excellent maintenance department keeps almost every bit of the company's own equipment in operation until, in a fast-changing aircraft industry, it becomes obsolete or scrapable.

However, because of a strong subcontracting policy, the company has a leading role in the brisk used machinery trade that is currently going on among the city's smaller machine shops.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
6' x 3/16" Niagara Initial Type
8' x 1/8" Webb 129-V Vertical
10' x 1/8" Bertsch Initial Type
10' x 1/8" King Pyramid Type
12' x 3/8" Southwark Pyramid Type
16' x 3/8" Niles Pyramid Type
20' x 1" Hilles & Jones Pyramid Type
30' x 3/8" Niles Pyramid Type

BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x 1/4" Dreis & Krump
12' x 3/8" Dreis & Krump

BRAKES—PRESS TYPE
10' x 1/4" Superior Hydraulic—NEW
10' x 1/8" Superior Hydraulic—NEW
12' x 1/2" Superior Hydraulic—NEW

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton Whiting	48' Span 220/3/60 A.C.
5 ton Shaw	56' Span 230 Volt D.C.
10 ton P&H	38' Span 230 Volt D.C.
10 ton Cyclops	40' Span 220/440 A.C.
10 ton Cleveland	47' Span 440/3/60 A.C.
15 ton P&H	48' Span 230 Volt D.C.
15 ton P&H	72' Span 230 Volt D.C.
25 ton L-B	75' Span 230/3/60 A.C.
Incl. 300 ft. Runway	
80 ton Niles	72' Span 230 Volt D.C.
120 ton Niles	68' Span 440/3/60 A.C.

FORGING MACHINES
1" to 5" Acme, Ajax, National
3" Acme Model XN, Air Clutch, NEW 1954

HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELLERS—ROLLER
44" Newbold Nine Rolls 4" Dia.
48" Kane & Roach 11 Rolls 4" O.D.
54" Aetna Standard 17 Rolls 3¾" Dia.
72" McKay 17 Rolls 4¼" Dia.
Budd-McKay Sheet Processing Machine & Roller Leveler, 15 Rolls 72" x 4¼" Dia.

PRESSES—HYDRAULIC
500 ton Elmes 18" Stroke Lower Platen 38" x 66"
750 ton Baldwin Triple Acting Bolster 84 x 133"
1200 ton United Steam Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESSES—HYDRAULIC WHEEL
600 ton N-B-P, 96" Between Strain Bars
800 ton N-B-P, 96" Between Strain Bars

PRESS—INCLINED
125 ton Beatty Open Back 1½" Stroke, Area of Bed 28⅞" x 26⅞"

PRESSES—STRAIGHT SIDE
Cleveand IT-48 Double Acting, 20" Stroke of Slide 14" Stroke of Blankholder, Bolster 48x48"
Clearing Model TF41500-200 Triple Acting Strokes 40, 32, 14", Bed Area 100" x 200"
Toledo 203B Overhanging, 10" Str. 38x40" Bolster
250 ton Bliss 89, 20" Stroke, Bolster 30"x30"
190 ton Toledo 58A, 14" Stroke, Bolster 36"x36"
170 ton Bliss 57", 14" Stroke, Bolster 32"x32"
150 ton Toledo #6½-60, 6" Stroke, Bolster 36"x60"
105 ton Toledo 56, 5½" Stroke, Bolster 25"x25"

PUNCH & SHEAR COMBINATIONS
ME-10 Pels Ironworker, Capacity Punch ¾" x ½", Shear 1⅛" Bd., 1⅜" Sq. 3 x 3 x ⅝" Angles
#44 x 48 Buffalo RAP, Capacity ½" x ⅝"
Cleveland Style G Single End, 60" Throat
#10 Kling, 48" Throat, Punch 2" thru 1"
No. 1½ Buffalo Universal Ironworker

ROLLS—FORMING
Model 14 L-M-1 Tishken Roll Forming Machine 1½" Dia. Spindle, 3½" Capacity, With Cut-Off

ROLLS—PLATE STRAIGHTENING
72" Bertsch Seven Rolls, 7" Dia.
86" H & J Six Rolls 10" Dia.
12' Newbold, Nine Rolls 14" Dia.

ROLLING MILLS
9" Three High Bar Mill
18" Three High Bar Mill
10" x 16" Single Stand, Two High
12" x 14" Twelve Stand, Two High Strip Mill
12" x 16" Phila. Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
26" x 54" United Single Stand, Two High
26" x 72" Cold Rolling Mill
44" x 144" Three High Sheet Mill
22" x 40" Three High Sheet Mill

SHEAR—GATE
96" x ¾" Beatty

SHEARS—SQUARING
6' x 10 Ga. Niagara No. 672
8' x ¼" Cincinnati

SLITTERS
12" Blake & Johnson
36" Wean Slitting Line
32" Stameo Slitting Line

SWAGING MACHINE
#6½A Fen. Capacity 2¼" Tube, 3¾" Solid 10" Die Length Hydraulic Feed, LATE

TESTING MACHINES
20,000# Baldwin Universal Hydraulic
60,000, 100,000, 200,000 Olsen & Riehle Universal
50,000 and 300,000 lb Compression

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SELECT MACHINE TOOLS

GRINDING MACHINES
No. 5 Abrasive 12" x 60" surface grinder.
72" Hanchett 3-spd. rotary surface, new 1948.
14" x 96" Pratt & Whitney hyd. vert. surface, 1942.
No. 74 Heald hyd. pl. internal, X-sliding H. S., 1941.
10" x 36" Landis type C hyd. pl. cylindrical, 1942.
6" x 30" Cincinnati EA Filmatic pl. cylindrical, 1942.

HAMMERS
No. 3C Chambersburg pneumatic, serial No. 2287.
No. 6-1 Nazel, pneumatic, late.
No. 6B Nazel, self-contained.

LATHES
No. 3 Gisholt Univ. Turret Lathes (2), 1942.
No. 5 Gisholt ram type Univ. Turret Lathe, 1940.
14" x 6' Hendey Toolroom, 1940.
15" x 30" Lipe Carbo-Matic, 1942.
36" and 42" Bullard New Era vertical turret lathes.
126" x 96' CC Niles Bement Pond engine lathe, 80 HP, M.D.

MILLING MACHINES
No. 2 Brown & Sharpe vertical mill, new 1943.
No. 4 Cincinnati high power plain horizontal- mill, serial E 506 J.
No. 5-48 Cincinnati hydromatic duplex mill, serial 3B51DIK-5.
No. 2-24 Cincinnati automatic simplex mill, serial No. 1B3PIT-1.

PRESSES
90 ton No. 92½C Toledo D.C. Str. Side.
200 ton No. 7-72 Bliss S.S. D.C. Press, Air Clutch.
200 ton No. 195½-72 Toledo D.C., Toggle drawing.
350 ton Elmes self-cont. 4-post Hydraulic Press, 1944.
500 ton No. 1039 Hamilton D.C. adj. bed, 60"x102".
2000 ton No. 0 National Maxipress Forging Press.

SHAPERS & SLOTTERS
24" Gould & Eberhardt Universal.
32" G & E Invincible, F.M.D.
36" Rockford hyd. vertical slotter, new 1944.

UPSETTERS
1½" National Upsetter, guided ram, hard ways.
3½" Ajax suspended slides, steel frame.
4" National high duty, susp. & guided rams.
7½" National Upsetter, air clutch, new 1944.

1000 Tools in Stock

Free Illustrated Catalog

MILES MACHINERY CO.
PHONE SAGINAW 2-3105
2041 E. GENESEE AVE. SAGINAW, MICH.

4" National Upsetter High Duty, guided overarm slide, air clutch
Ajax & National Upsetters, suspended slide, 2½", 3", 4"; similar upsetters not suspended slide, ¾", 1", 1½", 2", 3"
5" Acme Upsetting & Forging Machines suspended slide, cam side die slide
700-ton Ajax High Speed Forging Press
50,000# Standard Double Draw Bench
#3 Abramson Bar & Tube Straightener
Pels FV-75 Bar & Biller Shear, Cap. 7⅝" rd
10' x ½" Plate Shear, Long & Allstatter 10" throat, M.D. Rebuilt
Also 10' x ¾" L & A
Hilles & Jones and Buffalo Shears 1½", 2", 2½", 3", 3¼", 4" and 4¼"
1600 Chambersburg Model F Board Drop Hammers, Roller bearing; double V-ways, Built 1943
1500 lb. Niles Steam Forging Hammer
Bradley Hammers, various sizes, including 500# Upright
Nazel Air Forging Hammers, #2-B, 5-N
Williams White Bulldozers, #22, #3, #4, #25, #6, #29 U-type
Landis Landmaco and other Landis Threading Machines from ⅜ to 4"
Single and Double End Punches
Angle Shear H & J. 6 x 6 x 1"
No. 3 Motch & Merryweather Saw, with Saw Grinder
Wide assortment of heat treating furnaces, electric and oil

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

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1919 W. 74th Steet, Chicago 36, Ill.

REBUILT — GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

Qu.	K.W.	R.P.M.	Make	Volts D.C.	Volts A.C.
1	1250	720	G.E.	600	2300/4160
1	1000	720	Whse.	600	2300/4160
1	500	1200	Whse.	125/250	2300/440
1	500	720	Cr. Wh.	575/600	2300
1	300	1200	Al. Ch. 3-unit	250	2300
1	300	1200	G.E.	250	2300
1	200	1200	Cr. Wh.	250	2300
1	200	1200	Elliott	125	4000/2300
1	200	900	G.E.	250	2300
1	175	1200	G.E.	250	440/220
2	150	1200	Whse. SK	250	2300/440
2	150	1200	Reliance	125	2300/440
1	150	1200	G.E.	250	2300
1	100	1200	Whse. SK	125/250	440/220
1	100	1200	Al. Ch.	250	4600/2300

DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	1500	Whse.	Encl.	525	600
1	1000	G.E.	Mill	600	134/300
1	1050	G.E.	MPC	550	89
1	675	Al. Ch.	Rev.	550	65
2	600	Al. Ch.	Mill	600	300/600
1	500	Whse.	Rev.	250	285/700
1	350	G.E.	CD 109A	230	1150
1	300	Whse.	Mill	230	300
2	275	Whse.	Mill	230	425/850
1	220/250	El. Dy.	Ped. Brg.	230	400/1200
1	180	G.E.	MPC	230	400
1	175	G.E.	CD 175A	230	850/1025
1	150	Whse.	SK 201	230	300/900
2	125	Whse.	SK 154	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30 S	230	450/1350
1	80	Rel.	651 T	230	575/1150
2	75	Whse.	SK	230	250/1000
1	60/80	El. Dy.	25 S	230	525/1050
1	50	Whse.	SK 141	230	250/1000
1	35	Whse.	SK	230	250/1000
2	30/40	Whse.	SK 143	230	580/1580
1	20/25	Whse.	SK 121	230	200/1200
3	5/7½	Rel.	TEFC	230	337/1350

T. B. MAC CABE COMPANY
4302 Clarissa St., Philadelphia 40, Penna.
Cable Address "Macsteel" Philadelphia, Pa.
Phone Davenport 4-8300

BSA ½" & 1¾" Automatics, 1954.
Gleason 3" Str. Bevel Gear Generator.
Hardinge Nos. 57 & 59 2nd-oper. Lathes.
Fellows No. 4 Gear Shavers.

D. E. DONY MACHINERY CO.
4357 St. Paul Blvd. Rochester 17, N. Y.

BENNETT MACHINERY CO.

VERTICAL BORING MILLS
1—10' Niles, 2 Hds., Hvy., M.D.
1—10'-16' Niles Extension Type, Heavy, M.D.

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Phone PRescott 9-8996 N. Y. Phone LOngacre 3-1222

6' x ¼" Lown Initial Type Bending Roll, M.D.
6' x 12 Ga. Wysong & Miles Initial Type Bending Roll, M.D.

FALK MACHINERY COMPANY
16 Ward St. Baker 5887 Rochester 5, N. Y.

TOTAL OF 17,500-KW IN M.G. SETS

5—3500-KW, 3 Unit, Allis-Chalmers, Motor Generator Sets, Each consisting of:
2—1750-KW, 250/350 Volts parallel, 500/700 Volts series, 514 RPM, 5000 Amp., type HCC, rated continuous at 40 Deg. C. Allis-Chalmers DC Generators with Class B Insulation, separately excited, direct connected in the center to:
1—5000-HP, 3730-KW, 13800 Volts (6900 Volts), 3 Phase, 60 cycle, 514 RPM, 162 Amps., Allis-Chalmers, Synchronous Motor with Class B insulation, rated continuous at 40 Deg. C. Rise.
Each set equipped with a 40-KW exciter for synchronous motor fields, and a 10-KW exciter for generator fields, both 250-VDC at 514 RPM.
All mounted on a structural steel base approximately 27' long x 11' wide.
These Units are of the very latest type and design—condition excellent—were used only a short time—AC and DC Switchgear available. For any additional information and price, please contact one of the following dealers closest to you:

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4300 Clarissa Street, Philadelphia 40, Pa.
Moorhead Electrical Machinery Co.
120 Noblestown Road, Oakdale (Pittsburgh District), Pennsylvania
Brazos Engineering Co., Inc.
P. O. Box 9114, Houston, Texas
Duquesne Electric & Mfg. Co.
6428 Hamilton Avenue, Pittsburgh 6, Pa.

COMPRESSOR DIRECTORY
World's Best Rebuilts

95 CFM	1500 psi	6½-3⅞ x 1⅝ x 7 Chicago TCB3
138 CFM	100 psi	7 x 7 Ingersoll ESI
234 CFM	100 psi	9 x 9 x 9 Chicago St. (new)
298 CFM	500 psi	10-4½ x 10 Ingersoll XDB
343 CFM	500 psi	11-5 x 13 Worthington (new frame)
464 CFM	100 psi	12 x 11 Ingersoll ESI
552 CFM	100 psi	13—8 x 12 Ingersoll XRB
676 CFM	100 psi	15—8¼ x 12 Ingersoll XRB
686 CFM	100 psi	14 x 13 Ingersoll ESI
827 CFM	100 psi	17—10½ x 14 Ingersoll XRB
1040 CFM	100 psi	18—11 x 14 CP-OCE
1665 CFM	42 psi	16—16 x 12 Ingersoll XREI
1723 CFM	110 psi	140 lbs. st Ingersoll XPV (excellent)

Portables—Worthington 60 to 600 CFM

AMERICAN AIR COMPRESSOR CORP.
DELL & 48TH STREET
NORTH BERGEN, N. J.
Telephone UNion 5-4848

FOR SALE

48 x 72 Wheelabrator Shotblast Barrel
Serial A51283—Installed 1944
75 HP total 220 volts 3 phase 60 cycles
Jones 675 HS Style I reducer on mill drive
24000 CFM Schneible type HC Dust Collector
Installed 1944
40 HP drive on fan 3 HP pump
220/440 volts 3 phase 60 cycles
750 gallons settling tank

This equipment may be inspected in operation until end of this year.

A. JAY HOFMANN
Plant & Mill Equipment
Narberth, Penna.

LIFTING MAGNETS

A complete magnet service. Magnets, new & rebuilt, generators, controllers, reels, etc.

Magnet specialists since 1910

Goodman Electric Machinery Co.
1060 Broad St. Newark 2, N. J.

eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

DISC GRINDERS
No. 151 Besly, m.d.
Model V10 Hammond Belt Sander, m.d.
No. 4 Gardner Disc Grinder, m.d.
7½ H.P. U.S. Elec. Tool Co. Disc Grinder, m.d., new
14A Gardner Grinder, m.d.
No. 186—36" cap. Gardner, m.d., latest
No. 121 Hanchett Prod. Face Grinder, m.d.

SURFACE GRINDERS
No. 16 Blanchard Rotary, m.d.
No. 16A-2 Blanchard Auto. Rotary, m.d.
No. 2B Brown & Sharpe, m.d.
No. 33 Abrasive, m.d.
14" Pratt & Whitney Vertical, m.d.
14" Pratt & Whitney Model M 1640 Vertical, m.d.
No. A-1—8" Arter Surface Grinder
No. 22—12" Heald Rotary, m.d.
No. 25-A—24" Heald Rotary, m.d.
No. 25-A—30" Heald Rotary, m.d.
No. 2 Brown & Sharpe, m.d.
Model 84 Bridgeport Face Grinder
#300—60 Hanchett Vertical Spindle, m.d.
78" Type NT Rogers Knife Grinder, m.d.
16" x 24" x 120" Mattison, m.d.
Model T Builders Iron Foundry, m.d.
No. 900SS Hanchett Hydraulic Face, m.d.

PLAIN CYLINDRICAL GRINDERS
No. 5 Brown & Sharpe Plain Cylindrical, m.d., 1942
6 x 15" Cincinnati Plain Hydraulic, m.d.
6 x 18" Cincinnati Model EA, m.d.
6 x 18" Cincinnati Model ER, Plain Hydraulic, m.d., Filmatic Spindle
6 x 18" Landis Type C Hydraulic, m.d., late
10 x 18" Cincinnati Plain Hydraulic, Model ER, m.d., Filmatic Spindle, 1943
10 x 18" Cincinnati Model EA, m.d.
10 x 18" Norton Type C, m.d., latest

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times.

THE EASTERN MACHINERY COMPANY
1002 Tennessee Avenue, Cincinnati 29, Ohio
MElrose 1241 **CABLE ADDRESS—EMCO**

TRACK SUPPLIES — RAILS

New **RAILS** *Relaying*

TRACKWORK of all KINDS
LIGHT RAILS—12# to 60#—20'0" & 30'0"
HEAVY RAILS—60# to 100#—30'0" & 33'0"
JOINT BARS, BOLTS, TIE PLATES, SPIKES & TOOLS, FROGS, SWITCHES, STANDARD & SPECIAL TRACKWORK.

SEND US YOUR INQUIRIES

ALSO IN STOCK
STEEL
SHEETS & PLATES
STRUCTURALS
and Aluminum Products

KASLE STEEL CORPORATION
BOX 536 ROOSEVELT PARK ANNEX, DETROIT 32, MICH.—PHONE TIFFANY 6-4200

Overhead Cranes & Hoists
New and Used

250-ton Shaw, 68' span, 230 VDC, 2—125-ton trolleys
180-ton Shaw, 65' 0" span, 2—90-ton trolleys, 230 VDC
125-ton Alliance Ladle, 60' span, 25-ton aux. 230 VDC
120-ton Morgan, 65' span, 2—60-ton trolleys, 230 VDC
50-ton Northern, 10-ton aux. 55'5½" span, 440/3AC
2—30-ton Welman Engr. 5-ton aux. 80' span, 230 VDC
15-ton Northern, 77' span, 220/3/60 cy AC
7½-ton Shaw, 65'-10½ span, 220/3/60
2—7½-ton Shaw, 47' span, 230 VDC
1—10-ton Shaw, 36' span, 230 VDC with 100-ft. outside runway
10-ton Modern 37'-0" span, 220/3/60
1—15-ton P & H, 51'5½" span, 230 VDC
1—15-ton Morgan, 50'4" span, 3-motor, 230 VDC
1—5-ton Toledo, 60' span, 230 VDC
100 other cranes, various spans and current.

JAMES P. ARMEL, Crane Specialist
710 House Bldg. Pittsburgh 22, Pa.
Tele: GR 1-4449

Pyramid Bending Rolls

All Drop End—Complete
8' x ½"
18' x ¾"
20' x 1"

KINGS COUNTY MACH'Y. EXCH.
408 Atlantic Ave. B'klyn 17, N. Y.
TRiangle 5-5213

#2D Kearney & Trecker Rotary Head Tool and Die Milling Machine Serial #18-52-2. New 1945.

#300 Hanchett Vertical Surface Grinder Serial #300-17 capacity 13" x 72".

13" Peerless Power Hack Saws.

Cleveland Punch and Shear Model EF—34" Throat.

No. 47 Heald Single End Boramatic Serial #4646.

Greenfield #28 Internal Grinder Serial F4-11235.

Hazard Brownell Machine Tools, Inc.
350 Waterman St. Providence 6, R. I.
Dexter 1-8880

DIESEL LOCOMOTIVES
44 TON & 25 TON G. E. DIESEL ELEC.
STEEL SHEET PILING
215 TONS BETH. AP-3—20', 24' & 30'
177 TONS CARNEGIE M-116—31', 40' & 50'
300 TONS CARNEGIE MZ-27—40'
R. C. STANHOPE, INC.
60 E. 42nd St. New York 17, N. Y.

EQUIPMENT AND MATERIALS WANTED

EMPLOYMENT EXCHANGE

HELP WANTED

CHIEF DESIGN ENGINEER — Mechanical Engineer degree preferred—Broad experience required for design of facilities for integrated steel plant located in Southwest. Excellent opportunity in a well established, fast expanding organization. Pension plan, group hospitalization, vacation, sick leave, etc. Submit complete personal and professional resume in first letter. Address Box G-460, care *The Iron Age*, Chestnut & 56th Sts., Philadelphia 39, Pa.

METALWORKING BRIEFS

Barium Acquires Steel Plant Site

The Pennsylvania Railroad Co. announced that Phoenix Iron & Steel Co., subsidiary of Barium Steel Corp., has contracted for 1000 acres of land along the Delaware River in Burlington County, New Jersey, between Trenton and Camden. The site is several miles south of U. S. Steel's Fairless Works. The plot has a 3200-foot river frontage.

The PRR said that over a period of years a fully-integrated steel plant for production of plates and shapes will be constructed. The first stage, it was said, would involve a new blast furnace and a new oxygen steelmaking plant which will furnish ingots to the company's plants at Phoenixville and Harrisburg, Pa.

J. A. Sisto, board chairman of Barium, said that further details must await completion of an engineering survey now underway.

More Freight Increases May Come

Freight rate increases averaging 7 pct in the East and 5 pct in the West that were authorized Dec. 17 by the ICC are being followed up by another request for a 15 pct rise. The petition is pending with the ICC and hearings are scheduled for January. The Dec. 17 increase will cost shippers an extra $402 million a year in freight bills. The increase will add 56¢ a ton to the cost of moving steel scrap from Detroit to Pittsburgh; 77¢ from New England to Pittsburgh.

Price of British Steel Goes Up

The British Government on Dec. 17 authorized a steel price increase averaging 6 pct. It reflects increases in production costs and allows adjustment of profit margins to support expansion programs.

Surge In Oil Tanker Construction

The U. S. petroleum industry is planning to increase tanker tonnage by 50 pct in the next five years. If realized, it would mean a total capacity of 72 million tons by 1962. The Maritime Administration already has approved 27 new tankers requested by 15 shipping lines.

FRB Production Index Hits November High

Industrial production climbed another notch, setting a new November record, the Federal Reserve Board reports. Shoving the Board's seasonally adjusted index up to 147 pct of the 1947-49 average was stepped-up auto output. Gains in industrial machinery, aircraft and shipbuilding contributed to the rise.

$9 Million Expansion Begun By Union Steel

Union Steel Corp. announced it has begun work on a $9 million plant expansion at New Market, N. J., for increasing welded stainless steel pipe and tubing output.

ADVERTISERS

An asterisk beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturer for your copies today.

IN THIS ISSUE

XVIII

This is the eighteenth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Methods of Carburizing Alloy Steels

Carburizing is a means of impregnating the surface of steel with carbon, usually to very limited depths. Its purpose is to provide a hard, wear-resisting "case," or outer shell. Alloy steels, correctly handled, can be case-hardened without sacrificing desirable core properties.

There are three types of carburizing in general use. These will be discussed briefly in the following paragraphs:

Liquid Carburizing—The medium here is a hot salt bath composed basically of cyanide compounds. The steel is immersed in the bath, the period of immersion depending upon the analysis of the steel and the depth of case desired. Liquid carburizing produces a thin, hard, wear-resisting case with a maximum practical depth range of 0.02 to 0.03 in. When the steel is quenched directly from the bath, distortion is low.

Gas Carburizing—This method employs a furnace in which a carbonaceous atmosphere is created; i.e., gases that are high in carbon components, or those containing carbon. Steel subjected to gas carburizing can be case-hardened to depths generally ranging from 0.01 to 0.04 in. When quenching takes place immediately after carburizing, distortion can be kept to a minimum.

Pack Carburizing—Where the pack method is used, the parts to be carburized are buried in a container of dry carbonaceous materials. The container is sealed tight to prevent the infiltration of air, placed in a furnace and kept there for eight hours or more, the actual time depending upon the depth of case desired. Pack carburizing is particularly suitable where a deep case is essential (0.06 in. and over), although medium cases in the 0.04-to-0.06-in. range are possible.

The carburizing of alloy steels is a highly technical subject, and Bethlehem metallurgists will be glad to help you with any phase of it. Feel free to consult with them about the results to be expected from various analyses and the various methods of treatment. And when you are in the market for alloy steels of any kind, please bear in mind that Bethlehem Steel makes the complete range of AISI standard grades of alloy steels, as well as special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. I through No. XVI please write to us, addressing your request to Publications Dept., Bethlehem Steel Company, Bethlehem, Pa. The first 16 subjects in the series are now available in a handy 32-page booklet, and we shall be glad to send you a free copy.

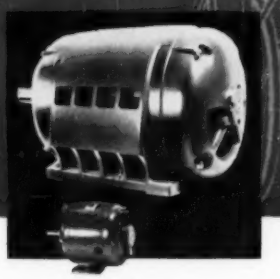
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Why not build the cart before the horses?



Just tell us here at Master what you want in power drives—and get the utmost in flexibility, compactness and performance. It probably won't be as complicated as the multi-shaft Gearmotor illustrated here, with 14 shafts turning at diverse speeds. But, regardless of what you need, Master can supply the right combination of horsepower, shaft speed and mounting features with whatever Master components are required—all combined in one compact efficient unit. Just ask for information.

Motor Ratings. 1/8 to 400 H.P. All phases, voltages and frequencies.

Motor Types... Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

Construction .. Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

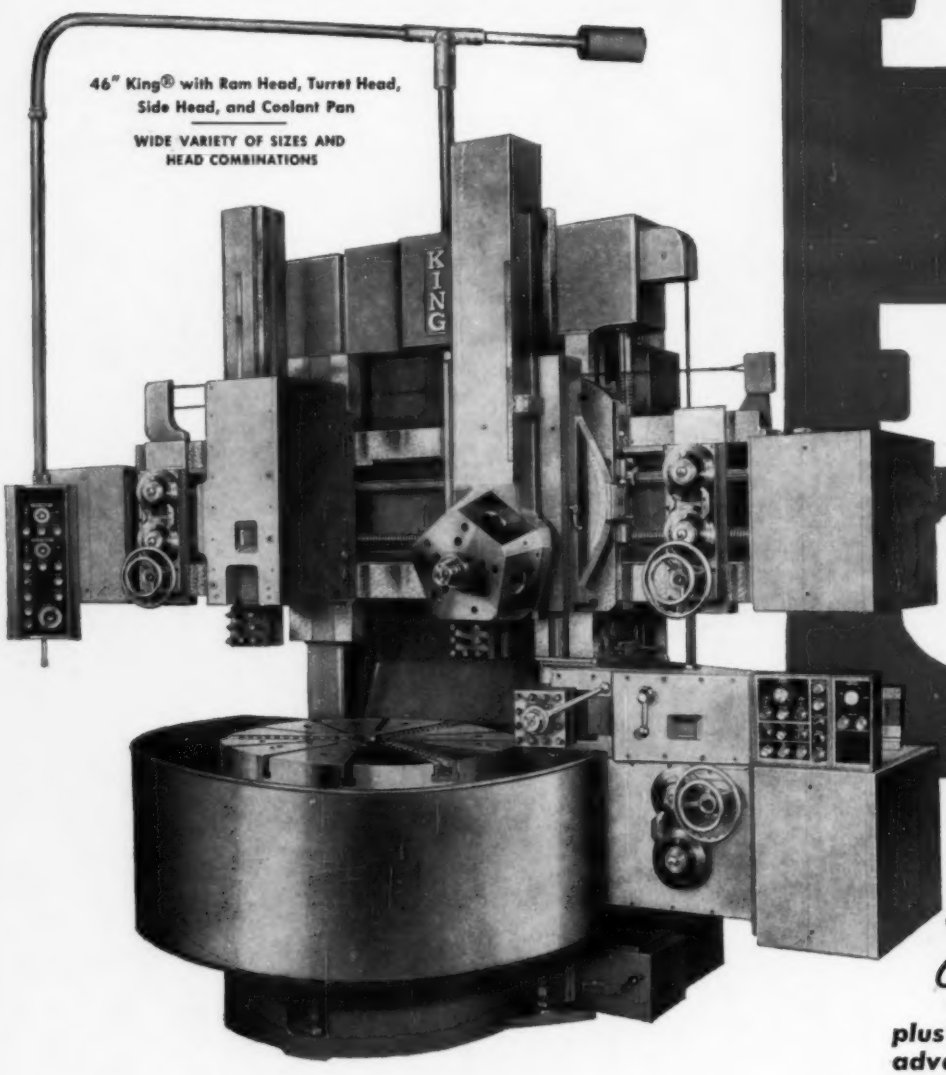
Speeds..... Single-speed, multi-speed, and variable speed.

Installation.... Horizontal or vertical, with or without flanges and other features.

Power Drive Features..... Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.

THE MASTER ELECTRIC COMPANY, Dayton 1, Ohio

All NEW KING



46" King® with Ram Head, Turret Head, Side Head, and Coolant Pan

WIDE VARIETY OF SIZES AND HEAD COMBINATIONS

Full Electrical Operation

plus many other advanced features:

INCREASED HORSEPOWER
40 to 50 H.P., on 30", 36", and 46" sizes, 75 to 100 H.P. on sizes 56" and up.

EXPANDED FEED AND SPEED RANGE
24 feeds from .0016" to .250" per revolution. 24 speeds in any one of three standard ranges —low, intermediate, or high.

AUTOMATIC LUBRICATION

OUTSTANDING NEW SPINDLE AND SPINDLE MOUNTING
—provides maximum table stability.

COMPLETE ELECTRICAL CONTROLS
—conveniently located on movable pendant and fixed-mounted side head panel.

DIALS FOR PRE-SELECTION OF FEEDS & SPEEDS

MACHINE ADAPTED FOR OPTIONAL ADDITION OF:
Automatic positioning of heads.
Automatic cycling.
Power rail clamping.
Power indexing of turrets.
Automatic tracing control of heads.

Q. What will it do for you?

A. Give you the greatest productive capacity ever achieved for your vertical boring and turning work!

For full information see your King distributor, or write us direct.

AMERICAN STEEL FOUNDRIES • KING MACHINE TOOL DIVISION
1150 Tennessee Avenue
Cincinnati 29, Ohio

KING VERTICAL BORING & TURNING MACHINES